
Formerly Utilized Sites
Remedial Action Program
(FUSRAP)

Maywood Chemical Company Superfund Site

ADMINISTRATIVE RECORD

Operable Unit 2 - Groundwater

Document Number

GW-001



**US Army Corps
of Engineers®**
New York District

REMEDIAL INVESTIGATION REPORT

FOR THE MAYWOOD SITE

NEW JERSEY

VOLUME I

DECEMBER 1992

Prepared for

United States Department of Energy

Oak Ridge Field Office

Under Contract No. DE-AC05-91OR21949

By

Bechtel National, Inc.

Oak Ridge, Tennessee

Bechtel Job No. 14501

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CONTENTS

	Page
Figures	vii
Tables	xii
Acronyms and Initialisms	xvii
Units of Measure	xxii
EXECUTIVE SUMMARY	ES-1
1.0 INTRODUCTION	1-1
1.1 PURPOSE	1-1
1.2 REGULATORY REQUIREMENTS FOR THE MAYWOOD SITE	1-3
1.3 SITE BACKGROUND	1-5
1.3.1 MCW and the Thorium Extraction Process	1-5
1.3.2 Background of MCW and the Maywood Site Properties	1-8
1.4 DESCRIPTIONS OF CURRENT SITE CONDITIONS	1-12
1.4.1 Stepan Property	1-12
1.4.2 Maywood Interim Storage Site	1-15
1.4.3 Residential Vicinity Properties	1-22
1.4.4 Commercial/Governmental Vicinity Properties	1-23
1.5 REPORT ORGANIZATION	1-27
2.0 STUDY AREA INVESTIGATIONS	2-1
2.1 SURFACE FEATURES INVESTIGATIONS	2-3
2.2 CONTAMINANT SOURCE INVESTIGATIONS	2-3
2.2.1 Radiological Investigations	2-4
2.2.2 Chemical Investigations	2-11
2.3 METEOROLOGICAL INVESTIGATIONS	2-16
2.4 SURFACE WATER/SEDIMENT INVESTIGATION	2-16
2.5 HYDROGEOLOGIC INVESTIGATION	2-18
2.6 GROUNDWATER SAMPLING AND ANALYSIS	2-19
2.7 DEMOGRAPHY AND LAND USE INVESTIGATIONS	2-20
2.8 ECOLOGICAL INVESTIGATIONS	2-21
3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA	3-1
3.1 SURFACE FEATURES	3-1
3.1.1 MISS	3-1
3.1.2 Stepan Property	3-2
3.1.3 Vicinity Properties	3-2
3.2 METEOROLOGY	3-2
3.3 SURFACE WATER HYDROLOGY	3-3
3.3.1 Receiving Waters	3-5
3.3.2 Drainage Characteristics	3-7
3.3.3 Water Balance	3-10
3.3.4 Flood Frequency	3-12
3.3.5 Erosion	3-14
3.4 SITE GEOLOGY	3-16
3.4.1 Regional Geology	3-16
3.4.2 Site-Specific Geology	3-23

CONTENTS
(continued)

	Page
3.5 HYDROGEOLOGY	3-42
3.5.1 Regional Hydrogeology	3-42
3.5.2 Site Hydrogeology	3-43
3.6 DEMOGRAPHY AND LAND USE	3-64
3.6.1 Land Use and Population	3-64
3.6.2 Drinking Water Sources	3-65
3.7 ECOLOGY	3-66
4.0 NATURE AND EXTENT OF CONTAMINATION	4-1
4.1 SOURCES	4-3
4.1.1 Primary Sources	4-4
4.1.2 Secondary Sources	4-9
4.2 SOIL AND VADOSE ZONE	4-10
4.2.1 Radioactive Contaminants	4-11
4.2.2 Chemical Contaminants	4-57
4.3 GROUNDWATER	4-120
4.3.1 Radioactive Contaminants	4-127
4.3.2 Chemical Contaminants	4-140
4.4 SURFACE WATER	4-167
4.4.1 Radioactive Contaminants	4-167
4.4.2 Chemical Contaminants	4-170
4.5 SEDIMENTS	4-176
4.5.1 Radioactive Contaminants	4-176
4.5.2 Chemical Contaminants	4-181
4.6 AIR	4-186
4.6.1 Radon Monitoring	4-188
4.6.2 Radon and Thoron Flux Monitoring	4-188
4.6.3 External Gamma Radiation	4-193
5.0 CONTAMINANT FATE AND TRANSPORT	5-1
5.1 PHYSICAL AND CHEMICAL PROPERTIES	5-2
5.1.1 Radionuclides	5-2
5.1.2 Chemicals	5-5
5.2 SITE CONCEPTUAL MODEL	5-15
5.2.1 Sources	5-15
5.2.2 Release Mechanisms	5-18
5.2.3 Transport Media	5-20
5.2.4 Intermedia Transfer	5-24
5.3 CONTAMINANT FATE AND TRANSPORT IN THE PRINCIPAL MEDIA	5-24
5.3.1 Soils and Groundwater	5-24
5.3.2 Surface Water and Sediment	5-34
5.3.3 Air	5-35
5.4 CONCLUSIONS	5-36

CONTENTS
(continued)

	Page
6.0 BASELINE RISK ASSESSMENT	6-1
7.0 SUMMARY AND CONCLUSIONS	7-1
7.1 SUMMARY OF SITE GEOLOGY AND HYDROLOGY	7-1
7.1.1 Site Geology	7-1
7.1.2 Site Hydrology	7-2
7.2 NATURE AND EXTENT OF CONTAMINATION	7-2
7.2.1 Stepan Property	7-2
7.2.2 Maywood Interim Storage Site	7-6
7.2.3 Residential Vicinity Properties	7-12
7.2.4 Commercial/Governmental Vicinity Properties	7-15
7.3 FATE AND TRANSPORT OF CONTAMINANTS	7-17
7.3.1 Stepan Property	7-18
7.3.2 Maywood Interim Storage Site	7-18
7.3.3 Residential Vicinity Properties	7-20
7.3.4 Commercial/Governmental Vicinity Properties	7-20
7.4 BASELINE RISK ASSESSMENT	7-21
7.5 DATA LIMITATIONS/FUTURE WORK	7-21
7.5.1 Data Limitations	7-21
7.5.2 Future Work	7-22
7.6 IDENTIFICATION OF POTENTIAL REGULATORY REQUIREMENTS	7-24
7.7 OBJECTIVES OF REMEDIAL ACTION	7-29
8.0 REFERENCES	R-1
APPENDIX A Summary of DOE Guidelines for Residual Radioactive Contamination	A-1
APPENDIX B Summary of Technical Specifications for the Installation of Boreholes and Monitoring Wells	B-1
APPENDIX C Radiological Data, Chemical Data, and Geologic Logs for Stepan Property	C-1
APPENDIX D Chemical Data and Geologic Logs for MISS (Storage Pile and Onsite)	D-1
APPENDIX E Radiological Data, Chemical Data, and Geologic Logs for Residential Vicinity Properties	E-1
APPENDIX F Radiological Data, Chemical Data, and Geologic Logs for Commercial/Governmental Vicinity Properties	F-1

CONTENTS
(continued)

	Page
APPENDIX G Field Investigation Report on Smoke Test of Sewer Lines at MISS	G-1
APPENDIX H Metals and Rare Earth Concentrations in Groundwater	H-1
APPENDIX I Data Quality	I-1
APPENDIX J Hydrogeologic Logs	J-1
APPENDIX K Background Concentrations of Chemical Constituents in Soil	K-1

FIGURES

Figure	Title	Page
1-1	Location of Maywood, Bergen County, New Jersey	1-30
1-2	Locations of the Properties That Comprise the Maywood Site	1-31
1-3	Locations and Status of Properties in Maywood and Rochelle Park	1-32
1-4	Locations and Status of Properties in Lodi	1-33
1-5	Process Possibly Used to Produce Mantle-Grade Thorium Nitrate at MCW	1-34
1-6	Thorium-232 Radioactive Decay Series	1-35
1-7	Uranium-238 Radioactive Decay Series	1-36
1-8	Burial Pit Locations on the Stepan Company Property	1-37
1-9	Generalized Land Use in the Maywood Site Area	1-38
1-10	MISS Areas and Depths of Radioactive Contamination	1-39
2-1	Offsite Surface Water and Sediment Sampling Locations for MISS	2-36
2-2	1989 Geologic Borehole and Monitoring Well Locations at MISS	2-37
2-3	Monitoring Wells at MISS and Vicinity	2-38
3-1	Drainage Basins in the Maywood and Lodi Areas	3-6
3-2	MISS Drainage Areas and Direction of Overland Flow	3-9
3-3	MISS Peak Flow/Return Period Relationship	3-13
3-4	100-Year Flood Zones in the Maywood Area	3-15
3-5	Distribution of Triassic Sediments in the Newark Basin	3-17
3-6	Ice Cover in New Jersey During Wisconsin Glacial Maximum	3-20
3-7	Glacial Deposits in New Jersey	3-21

FIGURES
(continued)

Figure	Title	Page
3-8	Proglacial Lake Hackensack	3-22
3-9	Contour Map Showing Top of Triassic Bedrock in the Lodi Area	3-26
3-10	Contour Map Showing Top of Triassic Bedrock in the Maywood Area	3-27
3-11	Isopach Map Showing Thickness of Unconsolidated Sediments in the Lodi Area	3-28
3-12	Isopach Map Showing Thickness of Unconsolidated Sediments in the Maywood Area	3-29
3-13	Locations of Geologic Cross Sections A-A', B-B', and C-C' Along Lodi Brook	3-35
3-14	Diagrammatic Subsurface Profile Section A-A'	3-36
3-15	Diagrammatic Subsurface Profile Section B-B'	3-37
3-16	Diagrammatic Subsurface Profile Section C-C'	3-38
3-17	Diagrammatic Subsurface Profile Section D-D'	3-40
3-18	Location of Cross Section D-D' at Flint Ink Property	3-41
3-19	Locations of Hydrogeologic Cross Sections A-A', B-B', and C-C' at MISS	3-44
3-20	Hydrographs of Wells MISS-2A Through MISS-4A, 1988-1991	3-46
3-21	Hydrographs of Wells MISS-2B Through MISS-4B, 1988-1991	3-47
3-22	Contour Map Showing Water Level Elevations in Unconsolidated Sediments at MISS, December 11, 1990	3-49
3-23	Contour Map Showing Water Level Elevations in Bedrock at MISS, December 11, 1990	3-50
3-24	Contour Map Showing Water Level Elevations in Unconsolidated Sediments at MISS, June 26, 1991 ...	3-51
3-25	Contour Map Showing Water Level Elevations in Bedrock at MISS, June 26, 1991	3-52

FIGURES
(continued)

Figure	Title	Page
3-26	Conceptual Groundwater Flow System at MISS	3-57
3-27	Hydrogeologic Cross Section A-A' at MISS	3-59
3-28	Hydrogeologic Cross Section B-B' at MISS	3-60
3-29	Hydrogeologic Cross Section C-C' at MISS	3-61
3-30	Isometric Net Diagram Showing Top of Triassic Bedrock in the Maywood Area	3-63
3-31	MISS Well Canvass Area: 4.8 km (3 mi) Radius	3-67
4-1	Locations of Primary Sources of Contamination	4-5
4-2	Background Sampling Areas in Relation to MISS	4-12
4-3	Stepan Property Surface Soil Sampling Locations ...	4-19
4-4	Stepan Property Areas of Surface Radioactive Contamination	4-21
4-5	Stepan Property Borehole Locations	4-22
4-6	Stepan Property Subsurface Radioactive Contamination	4-23
4-7	Stepan Property Locations of Gamma Exposure Rate Measurements	4-24
4-8	70 West Hunter Avenue Boreholes and Surface Soil Sampling Locations	4-30
4-9	79 Avenue B Sampling Locations and Areas of Radioactive Contamination	4-35
4-10	90 Avenue C Sampling Locations and Areas of Radioactive Contamination	4-36
4-11	90 Avenue C Indoor Gamma and Beta-Gamma Measurement Locations	4-38
4-12	90 Avenue C Radiological Condition After Removal Action	4-39
4-13	108 Avenue E Sampling Locations and Areas of Radioactive Contamination	4-40
4-14	112 Avenue E Sampling Locations and Areas of Radioactive Contamination	4-42

FIGURES
(continued)

Figure	Title	Page
4-15	113 Avenue E Sampling Locations and Areas of Radioactive Contamination	4-43
4-16	62 Trudy Drive Sampling Locations and Areas of Radioactive Contamination.	4-44
4-17	136 West Central Avenue Sampling Locations and Areas of Radioactive Contamination	4-46
4-18	200 State Route 17 Sampling Locations and Areas of Radioactive Contamination	4-48
4-19	Essex Street and State Route 17 Sampling Locations and Areas of Radioactive Contamination	4-53
4-20	113 Essex Street Sampling Locations and Areas of Radioactive Contamination	4-54
4-21	Interstate 80 (Westbound Right-of-Way) Sampling Locations and Areas of Radioactive Contamination	4-56
4-22	205 Maywood Avenue Sampling Locations and Areas of Radioactive Contamination	4-58
4-23	Stepan Property Locations of Chemical Boreholes and Areas of Subsurface Radioactive Contamination	4-70
4-24	Stepan Burial Pit 1, Cross Section A-A'	4-73
4-25	Stepan Burial Pit 1, Cross Section B-B'	4-74
4-26	Stepan Burial Pit 2, Cross Section A-A'	4-75
4-27	Stepan Burial Pit 2, Cross Section B-B'	4-76
4-28	Stepan Burial Pit 3, Cross Section A-A'	4-77
4-29	Storage Pile Borehole Locations at MISS	4-88
4-30	MISS Onsite Chemical Borehole Locations	4-93
4-31	Total Arsenic in Soil at MISS	4-98
4-32	Total Barium in Soil at MISS	4-99
4-33	Total Chromium in Soil at MISS	4-100

FIGURES
(continued)

Figure	Title	Page
4-34	Total Copper in Soil at MISS	4-101
4-35	Total Lead in Soil at MISS	4-102
4-36	Total Lithium in Soil at MISS	4-103
4-37	Total Selenium in Soil at MISS	4-104
4-38	Locations of Cross Sections A-A' and B-B' Showing Rare Earth Elements/Lithium/ Radioactive Contamination at MISS	4-108
4-39	MISS Cross Section A-A'	4-109
4-40	MISS Cross Section B-B'	4-110
4-41	Locations of Groundwater Wells Monitored for Radioactive and Chemical Contamination in 1990	4-126
4-42	Isoconcentration Contours Showing Lithium in Bedrock Groundwater at MISS, 1990 and 1991	4-161
4-43	Isoconcentration Contours Showing Boron in Bedrock Groundwater at MISS, 1990 and 1991	4-162
4-44	Isoconcentration Contours Showing Arsenic in Bedrock Groundwater at MISS, 1990 and 1991	4-163
4-45	Isoconcentration Contours Showing Chromium in Bedrock Groundwater at MISS, 1990 and 1991	4-164
4-46	Onsite and Fenceline Radon and External Gamma Radiation Monitoring Locations at MISS	4-187
4-47	Locations of Radon Flux Measurement Stations at MISS	4-192
4-48	Area of Elevated Radon Flux Measurements at MISS	4-194
4-49	External Gamma Radiation Exposure Rates	4-197
5-1	Conceptual Site Model	5-17
5-2	Intermedia Transfer Processes	5-25

TABLES

Table	Title	Page
1-1	Dose Conversion Factors for Uranium and Thorium Decay Series Radionuclides of Major Concern	1-41
1-2	Status of the Maywood Site Properties	1-42
1-3	Concentrations of Metals in Soils at MISS	1-47
2-1	Sampling Frequency and Analyses	2-23
2-2	Target Analyte List	2-26
2-3	Target Compound List	2-27
2-4	Monitoring Well Construction Summary	2-31
3-1	Summary of Climatological Data for the Newark Vicinity, 1951-1980	3-4
3-2	Field Permeability Test Results	3-54
3-3	Selected Data From Well Records Obtained During Canvass of Classification Review Area, Maywood Interim Storage Site	3-68
4-1	Analytical Results for Background Radionuclide Concentrations in Soil	4-13
4-2	Results of Isotopic Analysis of Soil	4-15
4-3	Data Collected from Interiors of Buildings, Stepan Property	4-27
4-4	Summary of Near-Surface Gamma Radiation Measurements for Residential Vicinity Properties	4-31
4-5	Summary of Downhole Gamma Log Results for Residential Vicinity Properties	4-32
4-6	Summary of Radiological Data for Residential Vicinity Properties	4-33
4-7	Summary of Near-Surface Gamma Radiation Measurements for Commercial/Governmental Vicinity Properties	4-49
4-8	Summary of Downhole Gamma Log Results for Commercial/Governmental Vicinity Properties	4-50

TABLES
(continued)

Table	Title	Page
4-9	Summary of Radiological Data for Commercial/ Governmental Vicinity Properties	4-51
4-10	Representative Background Metal and Rare Earth Concentrations in Soil, Maywood Site	4-62
4-11	Representative Background VOC Concentrations in Soil, Maywood Site	4-64
4-12	Representative Background BNAE Concentrations in Soil, Maywood Site	4-65
4-13	Representative Background Pesticide/PCB Concentrations in Soil, Maywood Site	4-67
4-14	Summary of Metal Concentrations in Soil, Stepan Property	4-69
4-15	Summary of Rare Earth Concentrations in Soil, Stepan Property	4-72
4-16	Summary of VOC Concentrations in Soil, Stepan Property	4-79
4-17	Summary of BNAE Concentrations in Soil, Stepan Property	4-80
4-18	Summary of Total Petroleum Hydrocarbons in Soil, Stepan Property	4-82
4-19	Toxicity Characteristic Constituents and Regulatory Levels	4-83
4-20	Chemical Borehole Locations and Depths, MISS Storage Pile	4-89
4-21	Summary of VOC Concentrations in Soil, MISS Storage Pile	4-90
4-22	Summary of BNAE Concentrations in Soil, MISS Storage Pile	4-92
4-23	Chemical Borehole Locations and Depths, MISS Onsite	4-94
4-24	Discrete Sample Intervals Analyzed for TCL Compounds in Soil, MISS Onsite	4-95
4-25	Summary of Metal Concentrations in Soil, MISS Onsite	4-97

TABLES
(continued)

Table	Title	Page
4-26	Summary of Rare Earth Concentrations in Soil, MISS Onsite	4-106
4-27	Summary of VOC Concentrations in Soil, MISS Onsite	4-111
4-28	Summary of BNAE Concentrations in Soil, MISS Onsite	4-113
4-29	Residential Vicinity Properties Requested Analysis Summary	4-115
4-30	Summary of Metal Concentrations in Soil, Residential Vicinity Properties	4-116
4-31	Summary of Rare Earth Concentrations in Soil, Residential Vicinity Properties	4-117
4-32	Commercial/Governmental Vicinity Properties Requested Analysis Summary	4-119
4-33	Summary of Metal Concentrations in Soil, Commercial/Governmental Vicinity Properties	4-121
4-34	Summary of Rare Earth Concentrations in Soil, Commercial/Governmental Vicinity Properties	4-122
4-35	Summary of VOC Concentrations in Soil, Commercial/Governmental Vicinity Properties	4-123
4-36	Summary of BNAE Concentrations in Soil, Commercial/Governmental Vicinity Properties	4-124
4-37	Concentrations of Total Uranium, Radium-226, and Thorium-232 in Groundwater at MISS, 1990	4-128
4-38	Trend Analysis for Total Uranium, Radium-226, and Thorium-232 Concentrations in Groundwater at MISS, 1986-1990	4-131
4-39	Summary of Dissolved and Total Radionuclide Concentrations Detected in MISS Groundwater, Fourth Quarter 1990 Through Third Quarter 1991	4-134
4-40	Laboratory Detection Limits for Metals Analyses of Surface Water, Sediment, and Groundwater at MISS	4-141
4-41	Laboratory Detection Limits for Organic Chemical Analyses of Surface Water and Groundwater at MISS	4-142

TABLES
(continued)

Table	Title	Page
4-42	Wells Sampled and Analyses Performed during 1990 Environmental Monitoring and from Fourth Quarter 1990 Through Third Quarter 1991	4-145
4-43	Organics Detected in Groundwater at MISS, 1986-1991, Listed by Compound	4-147
4-44	Organics Detected in Groundwater at MISS, 1986-1991, Listed by Well	4-151
4-45	Summary of Metals Detected in Groundwater at Concentrations Exceeding Guidelines	4-154
4-46	Summary of Mobile Ion Concentrations Measured in Groundwater at MISS	4-166
4-47	Concentrations of Total Uranium, Radium-226, and Thorium-232 in Surface Water at MISS, 1990	4-168
4-48	Trend Analysis for Total Uranium, Radium-226, and Thorium-232 Concentrations in Surface Water at MISS, 1986-1990	4-169
4-49	Summary of Dissolved and Total Radionuclide Concentrations in Surface Water at MISS Fourth Quarter 1990 Through Third Quarter 1991	4-171
4-50	Volatile Organic Compounds Detected in Surface Water at MISS During Third Quarter 1990	4-173
4-51	Summary of Dissolved and Total Metal Concentrations in Surface Water at MISS Fourth Quarter 1990 Through Third Quarter 1991	4-174
4-52	Summary of Dissolved and Total Rare Earth Concentrations in Surface Water at MISS Fourth Quarter 1990 Through Third Quarter 1991	4-175
4-53	Summary of Mobile Ion Concentrations Measured in Surface Water at MISS	4-177
4-54	Concentrations of Total Uranium, Radium-226, and Thorium-232 in Sediment at MISS, 1990	4-178
4-55	Trend Analysis for Total Uranium, Radium-226, and Thorium-232 Concentrations in Sediment at MISS, 1986-1990	4-180

TABLES
(continued)

Table	Title	Page
4-56	Summary of Radionuclide Concentrations Measured in Sediments at MISS Fourth Quarter 1990 Through Third Quarter 1991	4-182
4-57	Summary of Metal Concentrations Detected in MISS Sediments, Fourth Quarter 1990 Through Third Quarter 1991	4-183
4-58	Summary of Rare Earth Concentrations in Sediments at MISS, Fourth Quarter 1990 Through Third Quarter 1991	4-184
4-59	Summary of Mobile Ion Concentrations Measured in Sediments at MISS	4-185
4-60	Concentrations of Radon at MISS, 1990	4-189
4-61	Trend Analysis for Concentrations of Radon at MISS, 1986-1990	4-191
4-62	Average External Gamma Radiation Exposure Rates at MISS, 1990	4-195
4-63	Trend Analysis for External Gamma Radiation Exposure Rates at MISS, 1986-1990	4-198
5-1	Distribution Coefficients for Radionuclides Found at the Maywood Site	5-3
5-2	Distribution Coefficients for Thorium and Uranium in Various Types of Soil	5-4
5-3	Solubility at 20°C of Metals Detected at MISS	5-6
5-4	Solubility Product of Sparingly Soluble Compounds of Metals Detected at MISS	5-8
5-5	Typical Average Distribution Coefficients (K_d) for Various Elements in Sand, Soils, and Clays	5-10
5-6	Molecular Weight, Solubility, Vapor Pressure, Henry's Constant, and K_{oc} of Selected Organic Compounds	5-13
5-7	Diffusion Coefficients of Some Organic Compounds	5-14
5-8	Estimated Half-Lives of Selected Organic Compounds in Soils and Groundwater	5-16

TABLES
(continued)

Table	Title	Page
5-9	Representative Values of Saturated Hydraulic Conductivity and Saturated Water Content	5-21
7-1	Laws and Orders Potentially Applicable or Relevant and Appropriate to Proposed Remedial Action at the Maywood Site	7-27

ACRONYMS AND INITIALISMS

AEC	Atomic Energy Commission
ANL	Argonne National Laboratory
ARAR	applicable or relevant and appropriate requirement
ASTM	American Society for Testing and Materials
BGS	below ground surface
BNAE	base/neutral and acid extractable
BNI	Bechtel National, Inc.
BRA	baseline risk assessment
CCV	calibration curve verification
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CLP	Contract Laboratory Program
CME	Central Mine Equipment
CREAMS	Chemicals, Runoff, and Erosion from Agricultural Management Systems
CRDL	contract required detection limit
DCG	derived concentration guide
DDT	dichlorodiphenyltrichloroethane
DOE	U.S. Department of Energy
DQO	data quality objective
EIS	environmental impact statement
EP	extraction procedure
EPA	U.S. Environmental Protection Agency
FEMA	Federal Emergency Management Agency
FFA	federal facilities agreement

ACRONYMS AND INITIALISMS

(continued)

FS	feasibility study	
FSP	field sampling plan	
FUSRAP	Formerly Utilized Sites Remedial Action Program	
GC/EC	gas chromatography/electron capture	
GC/MS	gas chromatography/mass spectrometry	
GM	geometric mean	
GPR	ground penetrating radar	
GSD	geometric standard deviation	
HSP	health and safety plan	
ICAP	inductively coupled argon plasma	
ICPAES	inductively coupled plasma atomic emission spectrophotometry	
ICRP	International Commission on Radiological Protection	
ICV	initial calibration verification	
I.D.	inside diameter	
IDL	instrument detection limit	
IUPAC	International Union of Pure and Applied	Chemistry
K_d	distribution coefficient	
K_{oc}	organic carbon-based water partition coefficient	
K_p	soil-water partition coefficient	
LCS	laboratory control sample	
MCL	Maximum Contaminant Level	
MCLG	Maximum Contaminant Level Goal	
MCW	Maywood Chemical Works	

ACRONYMS AND INITIALISMS

(continued)

MDA	minimum detectable activity	
MED	Manhattan Engineer District	
MISS	Maywood Interim Storage Site	
MS	matrix spike	
MSD	matrix spike duplicate	
MSL	mean sea level	
NaI	sodium iodide	
NCB	National Community Bank	
NCP	National Oil and Hazardous Substances Contingency Plan	
NEPA	National Environmental Policy Act	
NJDEP	New Jersey Department of Environmental Protection	Prote
NJDEPE	New Jersey Department of Environmental Protection and Energy	
NPL	National Priorities List	
NRC	Nuclear Regulatory Commission	
NUS	NUS (Nuclear Utilities Services) Corporation	
O.D.	outside diameter	
ORAU	Oak Ridge Associated Universities	
ORNL	Oak Ridge National Laboratory	
OSHA	Occupational Safety and Health Administration	
PAH	polyaromatic hydrocarbon	
PARCC	precision, accuracy, representativeness, comparability, and completeness	
PCB	polychlorinated biphenyl	
PDCC	project document control center	

ACRONYMS AND INITIALISMS

(continued)

pH	negative logarithm of the hydrogen ion concentration
PIC	pressurized ionization chamber
PQAS	project quality assurance supervisor
PRAR	post-remedial action report
PVC	polyvinyl chloride
QA	quality assurance
QA/QC	quality assurance/quality control
QAPjP	quality assurance project plan
QC	quality control
RAGS	Risk Assessment Guidance for Superfund
RCRA	Resource Conservation and Recovery Act
RI	remedial investigation
RI/FS	remedial investigation/feasibility study
RI/FS-EIS	remedial investigation/feasibility study-environmental impact statement
ROD	record of decision
RPD	relative percent difference
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SDWA	Safe Drinking Water Act
SP	solubility product
SRM	standard reference material
TAL	target analyte list
TBC	to-be-considered
TC	toxicity characteristic

ACRONYMS AND INITIALISMS

(continued)

TCL	target compound list
TCLP	toxicity characteristic leaching procedure
TETLD	tissue equivalent thermoluminescent dosimeter
TMA/E	Thermo Analytical/Eberline
TMC	Technical Measurements Center
TOC	total organic carbon
TOX	total organic halides
TPH	total petroleum hydrocarbons
USBR	Unites States Bureau of Reclamation
USCS	Unified Soil Classification System
USGS	U.S. Geological Survey
USLE	Universal Soil Loss Equation
VOC	volatile organic compound

UNITS OF MEASURE

atm	atmosphere
Bq	becquerel
cfs	cubic foot/feet per second
cm	centimeter
cpm	count(s) per minute
°C	degree(s) Celsius (Centigrade)
dpm	disintegration(s) per minute
°F	degree(s) Fahrenheit
ft	foot/feet
g	gram
gal	gallon
gpm	gallon(s) per minute
h	hour
ha	hectare
in.	inch
kg	kilogram
km	kilometer
L	liter
lb	pound
m	meter
μ Ci	microcurie
μ g	microgram
μ mhos	micromhos
μ R	microroentgen
mCi	millicurie
mg	milligram

UNITS OF MEASURE

(continued)

mi	mile
min	minute
ml	milliliter
mm	millimeter
mmol	millimole
mol	mole
mph	mile(s) per hour
mR	milliroentgen
mrem	millirem
pCi	picocurie
ppb	parts per billion
ppm	parts per million
rem	roentgen equivalent, man
s	second
WL	working level
WLM	working level month
yd	yard
yr	year

EXECUTIVE SUMMARY

This executive summary briefly describes the activities and results of a remedial investigation (RI) conducted during 1989, 1990, and 1991 at the Maywood Site in Maywood, New Jersey. The RI was performed by the U.S. Department of Energy (DOE) in cooperation with the Environmental Protection Agency (EPA) Region II. The New Jersey Department of Environmental Protection and Energy was provided an opportunity to participate in developing the scoping and planning documents and to provide oversight to sampling activities.

The following sections provide basic background about the site (ES.1), explain the purpose of the RI and outline its goals (ES.2), and discuss the environmental requirements and agency responsibilities at the site (ES.3). Section ES.4 lists the activities performed at the site, and Section ES.5 summarizes the RI results in terms of the nature and extent of contamination. The potential fate and transport of contaminants are discussed in Section ES.6, and Section ES.7 presents basic conclusions and outlines future requirements for work at the site.

ES.1 BACKGROUND

The Maywood Site is located in Bergen County, New Jersey, approximately 20 km (12 mi) north-northwest of New York City and 21 km (13 mi) northeast of Newark, New Jersey. At Maywood, operations at the former Maywood Chemical Works (MCW) resulted in contamination of numerous properties in the boroughs of Maywood and Lodi and the township of Rochelle Park.

In 1916, MCW began extracting radioactive thorium and rare earths from monazite sand for use in manufacturing industrial products such as mantles for gas lanterns. The slurry that contained waste from the thorium processing operations was pumped to two earthen diked areas west of the plant. Some process wastes, along with tea and coca leaves from other MCW operations, were removed from the MCW property and used as mulch and fill on nearby properties, thereby contaminating those properties. Additional

waste apparently migrated off the property through natural drainage associated with the former Lodi Brook. MCW stopped extracting thorium in 1956, but thorium processing from stockpiled material continued until 1959. The property was sold to the Stepan Company in 1959; Stepan Company has never processed radioactive material.

In 1961, Stepan was issued an Atomic Energy Commission (AEC) radioactive materials license. On the basis of AEC inspections and information related to the property west of New Jersey State Route 17, Stepan agreed to take certain corrective actions and began to clean up residual thorium wastes in 1963, partially stabilizing residues and tailings. From 1966 through 1968, contaminated material was removed from the property west of Route 17 and buried in three burial pits on the Stepan property.

In 1968, AEC surveyed the area west of Route 17 and certified it for use without radiological restrictions. At the time of the survey, AEC was apparently not aware of contaminated waste materials still present in the northeast corner of the property. In 1968, this portion of the Stepan property was sold to a private citizen, who sold it in the 1970s to Ballod Associates; that area is now called the Ballod property.

The presence of radioactive materials in the northeast corner of the Ballod property was discovered in 1980. A survey of the area (Route 17, Ballod property, and Stepan property) identified the contaminants as thorium-232 and radium-226. Additional surveys confirmed high concentrations of thorium-232 in soil samples, and subsequent surveys indicated contamination not only on the Stepan and Ballod properties but also in areas to the north and south.

Subsequent investigations by Oak Ridge National Laboratory indicated that several residential properties were contaminated and required remedial action. DOE was authorized to undertake a decontamination research and development project at the Maywood Site by the Energy and Water Development Appropriations Act of 1984, and the Maywood Site was assigned to DOE's Formerly Utilized Sites Remedial Action Program (FUSRAP). In 1985, to expedite cleanup of the contaminated properties, DOE negotiated access to a 4.7-ha (11.7-acre) portion of the Stepan property for use as an

interim storage facility for contaminated materials; this area was designated as the Maywood Interim Storage Site (MISS). Subsequently, DOE began a program of removal actions (i.e., cleanup) at the vicinity properties and environmental monitoring at MISS. In September 1985, ownership of MISS was transferred to DOE.

The properties contaminated as a result of the original MCW activities include the property previously owned by MCW (now owned by the Stepan Company); MISS; and numerous residential, commercial, and governmental vicinity properties. These properties comprise the Maywood Site.

Many of these properties have been previously investigated, and some have been remediated. At the time of this RI, 25 of the 55 residential properties designated by DOE for remediation had been fully decontaminated, and one has since been partially decontaminated. Thirty have been characterized but remain to be remediated. Eight residential properties were investigated during the RI. Twenty-three commercial/governmental properties had been previously characterized, and a partial removal action had been conducted on the Ballod property. Five commercial/governmental properties were investigated during the RI.

ES.2 PURPOSE AND GOALS OF THE REMEDIAL INVESTIGATION

For the purposes of the Maywood Site RI, DOE grouped the properties into four operable units to obtain the greatest efficiency and effectiveness in performing and managing RI activities:

- Stepan Company property (also referred to as Stepan property)
- MISS
- Residential vicinity properties
- Commercial/governmental vicinity properties

The properties may be grouped differently for evaluating remedial action alternatives or when final remedial actions are

implemented.

The purpose of the RI was to define the nature and extent of contamination at the Maywood Site, determine the fate and transport of contaminants, and identify remedial action objectives. This information will then be used in a feasibility study (FS) to identify potential remedial action alternatives and potential applicable or relevant and appropriate requirements.

Historical data and data collected during the RI have been used to achieve the goals of this RI. The RI gathered data not collected during previous investigations and investigated properties that had been designated for inclusion in FUSRAP but had not been fully characterized.

The RI objectives for each operable unit were as follows:

Stepan property

- Determine the extent of surface radioactive contamination
- Determine horizontal and vertical boundaries of subsurface radioactive contamination
- Identify the chemical contaminants resulting from thorium processing operations
- Determine whether hazardous waste [as defined by the Resource Conservation and Recovery Act (RCRA)] is mixed with radioactive waste
- Determine whether wastes buried at Stepan have migrated from those burial areas
- Confirm the validity of previous surveys' radiological measurements of fixed and removable contamination within buildings
- Confirm the validity of previous surveys' measurements of gamma exposure rates within buildings and over outdoor surfaces

MISS

- Determine whether waste in the storage pile contains RCRA-hazardous waste or polychlorinated biphenyls (PCBs)
- Determine the average concentrations of radioactive waste in the pile
- Determine whether chemical contaminants are present in onsite soil and identify the contaminants
- Determine whether chemical contaminants are migrating from MISS through surface water, sediment, or groundwater
- Quantify the radon and thoron exposure pathways at MISS
- Quantify residual radioactive contamination on structural surfaces in Building 76
- Resolve data gaps to provide further understanding of the MISS groundwater system

Residential vicinity properties

- Determine the extent of surface radioactive contamination on residential vicinity properties not previously characterized
- Determine the horizontal and vertical boundaries of subsurface radioactive contamination on these properties
- Investigate the potential presence of chemical contaminants associated with thorium processing operations
- Determine the mechanisms of contaminant transport
- Measure the gamma exposure rates on each property

Commercial/governmental vicinity properties

- Determine the extent of surface radioactive contamination on commercial/governmental properties investigated as part of this RI
- Determine horizontal and vertical boundaries of subsurface radioactive contamination on these properties
- Investigate the potential presence of chemical contaminants

associated with thorium processing operations

- Determine the mechanisms of contaminant transport
- Measure the gamma exposure rates on each property.

ES.3 CLEANUP RESPONSIBILITIES AND REQUIREMENTS

Responsibility for cleanup of the radioactive and chemical contamination at the Maywood Site is shared by DOE and EPA. DOE's responsibilities are based on its role as manager of FUSRAP and its ownership of MISS; EPA Region II oversees DOE's work because the Maywood Site is listed on the National Priorities List. The shared responsibilities of the two agencies have been detailed in a negotiated federal facilities agreement (FFA) that became effective April 22, 1991.

Under the FFA, DOE is responsible for cleanup of "FUSRAP waste," which, as defined in the FFA, is specifically limited to

- All radioactive and chemical contamination, whether commingled or not, occurring on the DOE-owned MISS
- All radioactive contamination exceeding DOE action levels and related to thorium processing at MCW, occurring on any vicinity property

Chemical or nonradioactive contamination on vicinity properties is DOE's responsibility if the contamination satisfies either of the following conditions:

- If the contamination is mixed or commingled with radioactive contamination that exceeds DOE action levels
- If the contamination originated at DOE-owned MISS or if it is associated with specific thorium manufacturing or processing activities at MCW that resulted in the

radioactive contamination.

Remedial and removal actions at the Maywood Site are being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act. In addition, all DOE activities must be conducted in compliance with the National Environmental Policy Act, which requires that the environmental consequences of a proposed action be considered as part of the decision-making process for that action.

The FFA requires that EPA review all previous characterization and remediation activities conducted by DOE to determine functional equivalency with technical and substantive requirements of CERCLA, the National Contingency Plan, and the remedial investigation/feasibility study (RI/FS) process.

The Maywood Site is also being addressed through a separate RI/FS, which is being conducted by Stepan Company under EPA direction and oversight. DOE is addressing radioactive contamination as well as the contaminants that meet the definition of FUSRAP waste set forth by the FFA. Stepan Company is primarily responsible for nonradioactive or chemical contamination under an administrative order of consent signed with EPA in 1987 and an administrative order signed by EPA in 1991. Although DOE and Stepan RI/FS activities are being conducted independently, EPA oversight of both actions will ensure that sufficient coordination occurs between the parties to fully address the Maywood Site without duplication of effort.

ES.4 RI ACTIVITIES

Activities performed to meet the goals of the RI centered on collecting data and compiling information regarding surface features, contaminant sources, surface water and sediments, hydrogeology, meteorology, demography, and ecology. Surface feature investigations concentrated on aerial photographs, topographic maps, owner drawings (where available), and eyewitness accounts. Additional investigations performed included a

ground-penetrating radar survey of burial pits 1 and 2 at Stepan and portions of two commercial properties.

Contaminant source investigations were performed to evaluate potential waste source(s) and to further characterize radiological, chemical, and physical characteristics of materials within various media at the Maywood Site. These included radiological

investigations of the four operable units using near-surface gamma radiation surveys, surface and subsurface soil sampling, downhole gamma logging, and gamma exposure rate measurements.

Chemical investigations were performed on various properties to determine whether waste would be characterized as RCRA-hazardous upon removal and whether chemical contamination existed that met the FFA definition of FUSRAP waste.

Surface water/sediment investigations were performed to determine whether radioactive or chemical contaminants originating at MISS are migrating into (and being transported offsite by) the current surface water flow system and to determine any impact of waters from MISS on the surface waters in the vicinity.

The hydrogeologic investigation was conducted to further define the groundwater system at MISS and to provide additional data to supplement previous investigations. Sampling and analysis of groundwater were conducted to investigate the nature, extent, and concentrations of contaminants present in the groundwater and their potential for migration from MISS.

Meteorological, demographic, and ecological data were compiled by reviewing previous characterizations and historical information.

ES.5 NATURE AND EXTENT OF CONTAMINATION

ES.5.1 Stepan Property

The RI confirmed that the primary sources of radioactive contamination on the Stepan property are burial pits 1, 2, and 3. In the burial pits, the maximum concentration of thorium-232, which was the primary contaminant at the Maywood Site, was 1,592 pCi/g (burial pit 1). In addition, surface and subsurface soils

throughout the Stepan property were found to be radioactively contaminated; the maximum concentration of thorium-232 in surface soils was 380 pCi/g, and the maximum depth of subsurface contamination outside the burial pits was 4.6 m (15 ft).

Radioactive contamination on the Stepan property also occurs in areas where thorium processing operations were conducted and where process residues were used as fill material in low-lying areas. However, the areas of contamination are covered by grass or asphalt, so there is little potential for migration via surface water runoff.

DOE conducted limited chemical assessment of the Stepan property because of the separate RI/FS being conducted by the Stepan Company. In this limited chemical assessment, three rare earth elements (cerium, lanthanum, and neodymium) were detected with greater frequency and at higher concentrations than others, primarily in areas of radioactive contamination. These results are not unexpected because several rare earth elements (cerium, lanthanum, and dysprosium) are constituents of monazite sands, the feed material used in the thorium processing operations conducted by MCW. Sampling and analysis were also conducted for metals, volatile organic compounds (VOCs), and semivolatile or base/neutral and acid extractable (BNAE) compounds. Several metals known to be elemental components of monazite sands were detected at the highest concentrations and with the greatest frequency in areas where radioactive contamination also was found. Metals detected in association with radioactively contaminated soils included lithium, lead, arsenic, chromium, and selenium. In areas that are not radioactively contaminated, these metals were detected infrequently and at low concentrations. In these areas, any connection between the metals and thorium processing wastes would be difficult to establish because these metals occur naturally at trace concentrations in the earth's crust. The general occurrence of these metals in industrialized areas such as the Stepan Company property is also highly probable.

Most organic compounds detected at concentrations above representative mean background were polyaromatic hydrocarbons. These may be attributed to the natural decay of organic materials

or coal-derivative products (e.g., asphalt). These compounds are also commonly found in industrialized areas. BNAEs and petroleum hydrocarbons were occasionally found in association with radioactive waste.

ES.5.2 Maywood Interim Storage Site (MISS)

A complete radiological characterization of MISS onsite soils was conducted in 1986, and the data have been presented in a separate report (BNI 1987a). Therefore, radioactive contaminants in onsite soils at MISS were not addressed as part of this RI, other than to determine the average concentrations of uranium-238, radium-226, and thorium-232 in the interim storage pile.

Results of surface water and sediment sampling conducted at one upgradient and three downgradient locations under the routine environmental monitoring program (presented in Section 4.0) indicate no evidence that radioactive contaminants are migrating from MISS via either of these pathways.

Radiological characterization of the groundwater, based on DOE's routine environmental monitoring program, indicates that total uranium, radium-226, and thorium-232 concentrations are comparable at upgradient, offsite, and downgradient wells. The only exception is well B38W12A, which is located on an offsite property downgradient of Stepan and another offsite property, both of which are known to be radioactively contaminated. Though below guideline levels, consistently elevated concentrations of uranium have been detected in this well.

The chemical investigation of the interim storage pile and onsite soils at MISS produced no results that would identify the soil as RCRA-hazardous waste. No PCBs or pesticides were detected in any sample analyzed.

DOE is responsible for all chemical contamination on MISS. Of the 22 metals detected above representative mean background in MISS onsite soils, 8 (arsenic, cobalt, copper, lead, lithium, nickel, selenium, and vanadium) were identified as constituents of thorium ores, uranium analyte metals, or lithium wastes processed or disposed of onsite. These metals and four others (antimony,

barium, chromium, and cadmium) were detected at above-background concentrations. The latter four metals were also detected with varying frequency in areas of radioactive contamination; however, no definite associations were identified that would tie specific metals to radioactive contamination. Lithium, lead, chromium, and arsenic were most commonly found in association with radioactive contamination in the area of former retention ponds that served the entire chemical facility. This common association therefore does not necessarily indicate process waste. Chemical evaluation of soils at MISS identified three rare earth elements (cerium, lanthanum, and neodymium) in significant concentrations and frequency in both fill and native material. As was observed at the Stepan property, rare earth elements exist most frequently in areas of radioactive contamination, primarily in or near areas where historical information indicates that thorium processing took place.

Chemical analysis for VOCs and BNAEs indicated the occurrence of organic compounds at trace levels throughout the site. These compounds were detected at concentrations above mean representative baseline in only two areas: the Building 76 area and areas west of the interim storage pile near the locations of former retention ponds. There was no conclusive evidence of the coexistence of these compounds in radioactively contaminated areas. Historical information indicates that no organic constituents were used in the thorium processing operations at MCW, and the compounds detected are characteristic contaminants of industrialized, multiuse, and urban areas. However, DOE must address all chemical contaminants on MISS.

In groundwater, VOCs (predominantly tetrachloroethene, trichloroethene, dichloroethene, and vinyl chloride) were detected in localized areas at concentrations above existing Safe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs). Arsenic, chromium, and sulfate were detected at concentrations above existing and/or proposed SDWA MCLs and Maximum Contaminant Level Goals. Boron and lithium were also detected consistently at concentrations above background. The wells in which these elements were detected are located in areas where the same metals were

detected in soil samples. Because of uncertainties related to the source, nature, and extent of groundwater contamination at MISS, groundwater is addressed as a separate operable unit. A further evaluation of existing data is being conducted. Additional monitoring points have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan. An addendum to the RI report will be provided after this reevaluation and future work are completed.

Analysis of surface water samples for indicator parameters, metals, rare earth elements, mobile ions, and volatile and semivolatile organic compounds detected the metal lithium and three organic compounds at downstream sampling locations. Lithium, because of its high solubility, is probably migrating from MISS and has been carried by Westerly Brook to the Saddle River. The volatiles originate somewhere within the MISS/Stepan watershed or from groundwater seepage into the underground culvert that conveys Westerly Brook under MISS, but the source cannot be conclusively defined because of the industrialized history of the area. There is no evidence that organics were used in the MCW thorium processing operations.

Analyses of sediment samples provided no evidence that metal contaminants are migrating offsite.

ES.5.3 Residential Vicinity Properties

Radioactive contamination is present in both surface and subsurface soils on the residential properties investigated during the RI. Table ES-1 summarizes radionuclide concentrations and depths of contamination for each residential property. Because contaminated surface soils are covered by lawns or asphalt driveways, the potential for contaminant migration through air, surface water runoff, or groundwater infiltration is reduced.

Subsurface contamination appears to have resulted from sediment deposition in the former channel of Lodi Brook or its floodplain except at 90 Avenue C and 79 Avenue B, where contamination is the result of contaminated building materials and fill material, respectively, transported to the properties.

Limited chemical sampling was performed on the residential properties to determine the presence of chemical contamination tied to thorium processing. No evidence of RCRA-hazardous waste, PCBs, or pesticides was found. Metals and rare earth elements detected at MISS and the Stepan property were also detected on these residential properties, but at lower concentrations and with less frequency. In general, metals and rare earth elements were found in areas of radioactive contamination. Their occurrence can probably be attributed to the deposition of thorium process wastes (either by fill material emplacement or by transport via the former channel of Lodi Brook), or, at low concentrations, they may naturally occur in native soils.

ES.5.4 Commercial/Governmental Vicinity Properties

Radioactive contamination is present in surface and subsurface soils on these properties. Table ES-2 summarizes radionuclide concentrations and depths of contamination for each property. Because the contaminated surface soils (like the residential vicinity properties) are covered by lawns or asphalt driveways, the potential for contaminant migration via air, surface water runoff, or groundwater infiltration is reduced.

Limited chemical sampling was performed on these properties. Metals and rare earth elements detected are probably attributable to transport by the former channel of Lodi Brook. Their presence is primarily confined to areas of radioactive contamination. Organic constituents in soils were detected at low frequencies and at generally low concentrations. Tests for RCRA characteristics indicated that no hazardous waste is present, and no PCBs or pesticides were detected.

ES.6 CONTAMINANT FATE AND TRANSPORT

Contaminants identified as FUSRAP waste at the Maywood Site include radionuclides (primarily thorium-232), metals, and rare earth elements. The primary sources of contamination identified were burial pits at Stepan, former retention ponds on MISS, and the

interim storage pile at MISS. The principal migration pathways are groundwater, surface water, and air. Because most of the contaminants are confined to the unsaturated zone, their migration in groundwater is limited. Migration of metals and radionuclides may increase in the groundwater if the contaminants in the unsaturated soil zone reach the water table.

Most of the properties investigated during this RI are covered by grass, other thick vegetation, or asphalt. Therefore, surface water transport and air resuspension are relatively insignificant pathways for migration unless activities occur that disturb the coverings.

ES.7 CONCLUSIONS/FUTURE WORK

Except for groundwater data, this RI has successfully provided the additional data called for in the work plan. No new data gaps were identified that would require further investigation. Therefore, the RI phase of the CERCLA process is considered complete.

Characterization of the nature and extent of groundwater contamination is incomplete. The existing analytical data for groundwater are being reevaluated and integrated with other available data (e.g., the analytical data for soils and the hydrogeologic conceptual model). To aid in the delineation of the nature and extent of contamination entering and exiting MISS, additional monitoring points have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan. An addendum to the RI report will be completed after this reevaluation and other future work are completed.

Additional work to complete the RI/FS-environmental impact study process includes preparation of a baseline risk assessment and an FS to provide information necessary for the selection of an appropriate remedial action alternative. Results of a wetland delineation conducted by Stepan as part of their RI will be factored into the baseline risk assessment and FS for the Maywood Site. Treatability studies will be conducted to evaluate the feasibility of certain treatment technologies; this information

will aid the evaluation of remedial action alternatives.

Future work will include identification of historic/prehistoric resources and endangered species. DOE's routine environmental monitoring of groundwater, surface water, sediment, and air will continue. During remedial action, more detailed radiological surveys of the Stepan buildings will be required to better delineate the extent of contamination. The nature of contamination in burial pit 3 may also require further investigation; access limitations prevented sampling during this RI. For the purposes of future environmental documentation and review and analysis, contaminants found in burial pits 1 and 2 will be assumed to also be present in burial pit 3.

TABLES FOR EXECUTIVE SUMMARY

Table ES-1
Summary of Radiological Data for Residential Vicinity Properties

Property name	Radionuclide Concentrations in Surface Soil (pCi/g)			Radionuclide Concentrations in Subsurface Soil (pCi/g)			Depth of Subsurface Contamination (ft)	Interior Gamma Exposure Rates (μ R/h)	Exterior Gamma Exposure Rates ^a (μ R/h)
	U-238	Ra-226	Th-232	U-238	Ra-226	Th-232			
70 W. Hunter Ave.	<3.5 - <7.1	0.4 - 1.2	<0.5 - 3.2	<1.8 - <9.2	0.5 - 1.6	0.7 - 4.4	None	N/A	9 - 12
79 Avenue B	<4.2 - <9.8	0.4 - 4.6	0.7 - 68	<0.2 - <7.1	0.3 - 1.6	0.5 - 17.9	0.5 - 1.5	N/A	6 - 8
90 Avenue C	<2.5 - <10	<0.5 - 1.9	1.5 - 17	<1.4 - <35.3	0.4 - 4.2	0.4 - 72.5	0.5 - 2.5	36 - 38	9 - 20
108 Avenue E	<4 - <27	<0.7 - <9	1.1 - 19	<1.8 - <7.8	<0.3 - 2.8	<0.3 - 13	0.5 - 1.0	N/A	6 - 10
112 Avenue E	<2.6 - <17	0.5 - 3.7	0.6 - 34	<1 - <16	<0.2 - 4.4	0.4 - 17	0.5 - 4.0	N/A	9 - 21
113 Avenue E	<2.3 - 37	<0.5 - 3.7	<0.8 - 28	<1.1 - 13	<0.3 - 1.9	<0.4 - 13	0.5 - 1.0	N/A	8 - 14
62 Trudy Dr.	<2 - <9.5	0.6 - 3.7	1.3 - 12.7	<1.4 - 18.2	<0.4 - 10.8	<0.5 - 24.9	0.5 - 9.5	N/A	11 - 19
136 W. Central Ave.	<3.4 - <22.3	<0.6 - 2.3	<0.9 - 111.6	<2.3 - <25	<0.4 - 3.8	<0.6 - 63.9	0.5 - 8.0	12 - 20	8 - 15

^aMeasurements included background. Background for the Maywood area is 9 μ R/h.

N/A = no interior measurements obtained because near-surface gamma measurements (coneshield) were within background levels, and there was no indication that contamination extended beneath the residence.

Table ES-2
Summary of Radiological Data for Commercial/Governmental Vicinity Properties

Property name	Radionuclide Concentrations in Surface Soil (pCi/g)			Radionuclide Concentrations in Subsurface Soil (pCi/g)			Depth of Contamination (ft)	Exterior Gamma Exposure Rates ^a (μ R/h)
	U-238	Ra-226	Th-232	U-238	Ra-226	Th-232		
200 Route 17, Maywood (Sears Repair Center)	<1.8 - <1.9	0.3 - 5.6	<0.4 - 18.7	<1.3 - <12	0.3 - 4.3	0.3 - 59.4	0.5 - 4.0	6 - 23
Essex Street and Route 17, Maywood (Joseph Muscarelle & Associates)	<1.6 - 15	0.3 - 4.5	0.4 - 22	<1.2 - <10	0.3 - 1.8	<0.6 - 6.1	0.5 - 1.0	6 - 17
113 Essex St., Maywood (National Community Bank)	<2.8 - <5.1	<0.6 - 1.5	<0.8 - 5.6	9.0 - <14	0.3 - 10	0.2 - 18	0.5 - 9.0	5 - 17
Interstate 80, Lodi (Westbound Right-of-Way)	<2.5 - <4.6	<0.6 - <0.8	<0.8 - 3.3	<1.4 - <10.6	<0.3 - 7.3	0.4 - 5.2	1.0 - 5.5	6 - 12
205 Maywood Ave., Maywood (Myron Manufacturing)	<3 - <9.3	<0.6 - 4.1	0.6 - 9.8	<1.4 - <9.7	<0.1 - 2.5	0.4 - 31	0.5 - 2.0	5 - 13

^aMeasurements include background. Background for the Maywood area is 9 μ R/h.

1.0 INTRODUCTION

This report describes the activities and documents the results of a remedial investigation (RI) conducted at the Maywood Site in Maywood, New Jersey. The RI was performed during 1989, 1990 and 1991 by the U.S. Department of Energy (DOE) in cooperation with and oversight by the Environmental Protection Agency (EPA) Region II. The New Jersey Department of Environmental Protection and Energy (NJDEPE) was provided an opportunity to participate in the development of the scoping and planning documents and to provide oversight to sampling activities.

This introductory section presents background information about the site, explains the regulatory requirements that are guiding work there, and describes why the RI was performed and the objectives that were to be accomplished. Section 1.1 briefly describes the site and explains the purpose and objectives of the RI. Section 1.2 reviews the regulatory requirements and DOE/EPA responsibilities for the site. A review of the site background is presented in Section 1.3. Section 1.4 summarizes previous investigations and describes current site conditions. Section 1.5 is a reader's guide to the organization and content of subsequent sections of the RI report.

1.1 PURPOSE

In 1974, the U.S. Congress authorized the Atomic Energy Commission (AEC), a predecessor agency to DOE, to initiate the Formerly Utilized Sites Remedial Action Program (FUSRAP), a program now managed by DOE. FUSRAP's mission is to identify and clean up or otherwise control sites where residual radioactive contamination (exceeding current guidelines) remains from activities carried out under contract to the Manhattan Engineer District (MED) and AEC. The goals of FUSRAP are to (1) control contamination at the sites, (2) keep the sites in compliance with applicable criteria for the protection of human health and the environment, and (3) to the extent possible, certify the sites for use without restrictions

following decontamination. In addition to the former MED and AEC sites, Congress has authorized DOE--through FUSRAP--to undertake remedial actions at four other sites, where commercial operations had resulted in radioactive contamination of the environment. One of these is the Maywood Site, which is located in Bergen County, New Jersey, approximately 20 km (12 mi) north-northwest of New York City and 21 km (13 mi) northeast of Newark, New Jersey (Figure 1-1).

At Maywood, operations at the former Maywood Chemical Works (MCW) resulted in contamination of numerous properties in the boroughs of Maywood and Lodi and the township of Rochelle Park. These contaminated properties include the property previously owned by MCW (now owned by the Stepan Company); the DOE-owned property referred to as the Maywood Interim Storage Site (MISS); and numerous residential, commercial, and governmental vicinity properties. Together, all these properties comprise the Maywood Site (Figure 1-2). Figures 1-3 and 1-4 show the locations and status of the properties.

For the purposes of the Maywood Site RI, DOE has grouped the properties into four operable units:

- Stepan Company property (also referred to as Stepan property)
- MISS
- Residential vicinity properties
- Commercial/governmental vicinity properties

The properties were grouped in this way to obtain the greatest efficiency and effectiveness in performing and managing RI activities. The properties may be grouped differently for the purpose of evaluating remedial action alternatives or when final remedial actions are implemented. Under current plans, a single record of decision (ROD) will be prepared for the Maywood Site that will cover all operable units as they are defined during the feasibility study (FS) and remedial action planning process.

The purpose of the RI is to define the nature and extent of

contamination, determine the fate and transport of contaminants, and identify remedial action objectives. This information is then used in the FS to identify potential remedial action alternatives and potential applicable or relevant and appropriate requirements (ARARs). To achieve the goals of this RI, both historical data and data collected during 1990-1991 field activities have been used. The RI activities included gathering data not collected during previous characterization activities and completing the characterization of properties that were designated for inclusion in FUSRAP after earlier characterizations had been conducted. This report:

- Documents the 1990-1991 RI activities
- Interprets the 1990-1991 data in combination with historical data regarding the nature and extent of contamination (Section 4.0)
- Assesses the potential for migration of contaminants from the properties, i.e., contaminant fate and transport (Section 5.0)
- Defines potential remedial action objectives (Section 7.0)

1.2 REGULATORY REQUIREMENTS FOR THE MAYWOOD SITE

Remedial and removal actions conducted by DOE at the Maywood Site are being coordinated with EPA Region II under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendments and Reauthorization Act (SARA).

It is DOE policy under DOE Order 5400.4 to integrate the requirements of CERCLA and the values of the National Environmental Policy Act (NEPA) for remedial actions at sites for which it has responsibility. A key element of the integrated CERCLA/NEPA process is to determine the level of environmental analysis that

would be the most appropriate means of incorporating NEPA values. This determination is a function of many factors, including the complexity of a proposed action, the likelihood of significant environmental impacts, and the potential for considerable public interest. Because some of the remedial action alternatives to be considered for the Maywood Site include activities that may have potential for significant impact on the environment, DOE will prepare an integrated RI/FS-environmental impact statement (EIS) for the Maywood Site.

Lead agency responsibility for cleanup of FUSRAP waste and chemical contamination lies with DOE and EPA, respectively, at MCW, which is a National Priorities List (NPL) site. DOE's lead agency responsibility and EPA's oversight role for the cleanup of FUSRAP waste are based upon DOE's assigned responsibility under FUSRAP, EPA's statutory responsibilities, and a federal facilities agreement (FFA) negotiated between DOE and the EPA Region II office that became effective April 22, 1991. Under this FFA, DOE is only responsible for cleanup of "FUSRAP waste," which, as defined in the FFA, is specifically limited to:

- All radioactive and chemical contamination, whether commingled or not, occurring on the DOE-owned MISS
- All radioactive contamination exceeding DOE action levels and related to thorium processing at MCW, occurring on a vicinity property

Nonradioactive chemical contamination that occurs on vicinity properties is DOE's responsibility if the contamination meets either of the following conditions:

- If the contamination is mixed or commingled with radioactive contamination that exceeds DOE action levels
- If the contamination originated at the DOE-owned MISS or if it is associated with specific thorium manufacturing or

processing activities at MCW that resulted in the radioactive contamination

The FFA requires that EPA review all previous characterization and remediation activities conducted by DOE to determine functional equivalency with technical and substantive requirements of CERCLA, the National Oil and Hazardous Substances Contingency Plan (NCP), and the RI/FS process. This determination is expected to be completed prior to the publication of the RI/FS-EIS.

Chemical contamination not on MISS (or not shown to be migrating from MISS) and not mixed with FUSRAP waste is being investigated by Stepan Company through an agreement signed by EPA and Stepan Company in 1987 and an order signed by EPA in 1991. EPA is the lead agency in that investigation.

1.3 SITE BACKGROUND

The following sections describe the operations at MCW that resulted in contamination at the Maywood Site (Section 1.3.1) and provide background information about MCW and the Maywood Site properties--leading up to involvement by DOE (Section 1.3.2).

1.3.1 MCW and the Thorium Extraction Process

MCW was constructed in 1895. In 1916, the plant began extracting thorium and rare earths from monazite sand for use in manufacturing industrial products such as mantles for gas lanterns. The manufacturing process involved the production of mantle-grade thorium nitrate (Harris 1951). MCW also produced lithium compounds such as lithium hydroxide and lithium chloride (NRC 1981a), rare earths, detergents, alkaloids, and essential oils in other process operations. Thorium extraction ceased in 1956, but thorium processing of stockpiled material continued until 1959. The property was sold to the Stepan Company in 1959; Stepan Company has never processed radioactive material.

The primary radioactive contaminant at the Maywood Site is thorium-232 and its associated daughter products, with lesser

amounts of radionuclides in the uranium-238 decay chain (BNI 1987a). Recoverable wastes from thorium processing operations were stored in an unsheltered phosphate pile that was located between buildings in the main yard. Unrecoverable wastes from thorium processing operations (i.e., residues and tailings) were piped to a large pile on the perimeter of the MCW property (Cole et al. 1981). The pile, containing several tons of waste slurry, was surrounded by earthen dikes but remained exposed to weather (AEC 1957). Lithium wastes from other MCW process operations also are believed to have been disposed of in the diked areas on the MCW site. In addition, other chemical constituents such as metals and volatiles have been identified in soils and groundwater at MISS (BNI 1986a, 1987b, 1989a; Ebasco 1987, 1988).

Based on correspondence regarding plant operations and on a reconstruction of the chemical processes involved, the primary chemicals used in the extraction process are thought to have included sulfuric acid, nitric acid, oxalic acid, and a carbonate solution (Heatherton 1951; AEC 1957; Albert 1966; Eister and Kennedy 1974; Stokinger 1981; Jones 1987). Figure 1-5 illustrates the process as it is understood today.

Reconstruction of the thorium extraction process has been used to help identify the radionuclide constituents of FUSRAP waste at the Maywood Site. Thorium exists as thorium phosphate (up to 20 percent by weight) in raw monazite ore (Dana 1955). The feed material for the thorium extraction process at MCW was monazite sand. It is not known whether the origin of the monazite sands processed at MCW was Brazilian, Indian, or domestic (Idaho, Florida, or Carolina sands); the composition is similar, regardless of origin. In addition to thorium, monazite sands contain uranium, metal phosphates, and rare earth elements. The rare earth elements that are constituents of the monazite sands used in thorium processing operations include those most frequently anticipated and detected during this remedial investigation (RI), i.e., cerium, lanthanum, and neodymium. Monazite sands differ chemically from other uranium- and thorium-producing ores primarily in that they do not contain substantial concentrations of cobalt, molybdenum, and vanadium. The potential occurrence of constituents of monazite sands as nonradioactive contaminants at the Maywood Site is acknowledged. Uranium is an elemental component of monazite sands (substituted for thorium in trace amounts), and some of the analogue elements associated with uranium ores have been identified as constituents of FUSRAP waste as defined by the FFA.

In unprocessed, undisturbed ores, thorium-232 coexists with all of the decay products in the thorium decay series (Figure 1-6) and is most often found in secular equilibrium, a state in which each radionuclide in the decay series has the same decay rate (activity) as the parent (thorium-232). Uranium-238 is also present in monazite ore (at lower concentrations), and its decay products (Figure 1-7) would also be in secular equilibrium. Small amounts of uranium-235 (from the actinium decay series) and its associated decay products would also be present in monazite ore. However, due to the low natural abundance of these radionuclides and their low concentrations in this waste material, the total activity contributed by their decay series is only a small fraction of the total activity of the waste.

Substantial amounts of thorium-232 and thorium-228 (thorium decay series) would be removed in the extraction process, leaving

primarily decay products (Figure 1-6). The waste component would also contain unextracted thorium-232 and thorium-228. Due to the relatively short half-lives of their decay products, these radionuclides would reestablish equilibrium in 20 to 30 years. One of these decay products is radon-220, a gas that would be released by emission from exposed surfaces and would decay elsewhere.

Most of the thorium-234 and thorium-230 (uranium decay series) would be removed during the extraction process. This would leave residual thorium-234, thorium-230, and decay products from the uranium series (including radium-226) in the waste component (Figure 1-7). Following rapid decay through protactinium-234, decay of thorium-234 would nearly halt due to the quarter-million-year half-life of uranium-234. Decay of thorium-230, which has a half-life of 77,000 years, would be further slowed by the 1,600-year half-life of radium-226. Therefore, the waste component would contain unextracted fractions of thorium-234 and thorium-230, unextracted uranium-238, and decay products from both the monazite ore and ingrowth components (protactinium-234, uranium-234, and radium-226). Radon-222, which is a gas, would be partially emitted from waste surfaces and would decay elsewhere. Secular equilibrium for this series would not be reestablished.

Based on this understanding of the thorium extraction process, risk coefficients for the radionuclides involved, and the specific DOE guidelines for residual radioactivity, the radionuclides of concern for the Maywood Site were identified. Table 1-1 provides dose conversion factors for the radionuclides residual to the extraction process and those formed by ingrowth. DOE guidelines for residual radioactive material address thorium-232, thorium-228, radium-228, and radium-226.

1.3.2 Background of MCW and the Maywood Site Properties

As mentioned previously, the slurry that contained waste from the thorium processing operations at MCW was pumped to two earthen diked areas west of the plant (Cole et al. 1981). In 1932, the disposal areas were separated from the plant and partially covered by the construction of New Jersey State Highway 17 (Route 17).

Some thorium process wastes, along with tea and coca leaves from other MCW processing operations, were removed from the MCW property and used as mulch and fill on nearby properties, thereby contaminating those properties with radioactive constituents of the waste (Mata 1984).

Additional waste migrated off the property via natural drainage associated with the former Lodi Brook. Historical photographs and maps indicate that the former course of the brook, which originated on the MCW property, generally coincides with the distribution of contaminated properties in Lodi. Most of the open stream channel in Lodi has been replaced by a subsurface storm drain system.

In 1954, AEC issued License R-103 to MCW, allowing it to continue to possess, process, and distribute radioactive materials under the authority of the Atomic Energy Act of 1954. Thorium extraction ended in 1956, and MCW stopped processing thorium from stockpiled material in 1959; the property was sold to the Stepan Company that same year.

In 1961, the Stepan Company was issued an AEC radioactive materials license (STC-1333). Based on AEC inspections and information related to the property west of Route 17, Stepan agreed to take certain corrective actions, although the company never processed radioactive materials on that property. Stepan began to clean up residual thorium wastes in 1963, partially stabilizing residues and tailings in place by covering them with clean soil. In 1966, 6,400 m³ (8,400 yd³) of contaminated material was removed from the property west of Route 17, returned to the Stepan property, and buried at burial pit 1 (Figure 1-8), an area now covered with grass. In 1967, an additional 1,600 m³ (2,100 yd³) of material was removed from the same general area and buried on the Stepan property at burial pit 2, which is now a parking lot (Figure 1-8).

In 1968, Stepan obtained permission from AEC to transfer an additional 6,600 m³ (8,600 yd³) of waste from the area west of Route 17 and bury it in burial pit 3, where a warehouse was later constructed (Figure 1-8). Stepan's AEC source material license (STC-1333) indicates that the waste relocated to burial pit 3 was placed in five trenches, which are shown in Figure 1-8. The

license documents indicate that the waste in burial pit 3 contained approximately 0.25 percent thorium in the form of thorium hydroxide or thorium phosphate. Based on that information, burial pit 3 was estimated to contain 16,300 kg (36,000 lb) of thorium, with a calculated corresponding thorium-232 activity concentration of 270 pCi/g (Stepan 1981). During the same year, AEC conducted a survey of the area west of Route 17 and certified it for use without radiological restrictions. At the time of the survey, AEC was apparently not aware of contaminated waste materials still present in the northeast corner of the property. In 1968, this portion of the Stepan property was sold to a private citizen, who later sold it (in the 1970s) to Ballod Associates (Cole et al. 1981). That area is now called the Ballod property.

The presence of radioactive materials in the northeast corner of the Ballod property was discovered in 1980, after a private citizen reported the discovery of radioactive contamination near Route 17 to the New Jersey Department of Environmental Protection (NJDEP). A radiological survey of the area (Route 17, Ballod property, and Stepan property) conducted by NJDEP identified the contaminants as thorium-232 and radium-226. The Nuclear Regulatory Commission (NRC) was notified of the results and undertook additional surveys from November 1980 to January 1981; these surveys confirmed high concentrations of thorium-232 in soil samples collected from both the Stepan and Ballod properties (NRC 1981a,b). Accordingly, NRC requested a comprehensive radiological survey of the area.

In January 1981, EG&G Energy Measurements Group conducted an aerial radiological survey of the Stepan property and surrounding properties (EG&G 1981). The survey, which covered a 10-km² (3.9-mi²) area, indicated contamination not only on the Stepan and Ballod properties, but also in areas north and south of the Ballod property. During February 1981, Oak Ridge Associated Universities (ORAU) performed a separate radiological ground survey of the Ballod property (Cole et al. 1981). An additional radiological survey of the Stepan and Ballod properties (commissioned by the Stepan Company) was conducted in June 1981 with similar findings (Morton 1982). Limited chemical sampling was also performed by

Ebasco Services (Ebasco 1987, 1988) for EPA.

Following these investigations, Oak Ridge National Laboratory (ORNL) embarked on a program to survey properties in the vicinity of the Stepan Company plant. Surveys of properties along Davison Avenue and Latham Street were performed by ORNL in June 1981, and seven properties were later designated for remedial action (ORNL 1981a-g). [One additional property on Davison Avenue was designated in 1986 (ORNL 1986a)].

DOE was authorized to undertake a decontamination research and development project at the Maywood Site by the Energy and Water Development Appropriations Act of 1984, and the site was assigned to FUSRAP. Accordingly, in late 1983, vicinity properties on Grove Avenue and Park Way were surveyed by Bechtel National, Inc. (BNI), under contract to DOE, and nine of these properties were designated for remedial action (Coffman 1983). A "drive-by" survey of properties in Lodi (using a mobile van) was conducted by ORNL in June 1984; the results indicated additional contamination (ORNL 1984a). This survey was followed by ground surveys that included limited sampling to determine whether contamination in excess of DOE guidelines was present, which would result in designation of the property for inclusion in FUSRAP (ORNL 1984b-e).

Further characterization of designated properties was conducted by ORNL and BNI in 1986, 1987, and 1988. Table 1-2 lists the properties where designation, characterization, and remediation have been performed and indicates the current status of each of the properties that comprise the Maywood Site.

In 1985, to expedite cleanup of the vicinity properties, DOE negotiated access to a 4.7-ha (11.7-acre) portion of the Stepan property for use as an interim storage facility for contaminated materials; this area was designated as MISS. Subsequently, DOE began a program of removal actions (i.e., cleanup) at the vicinity properties and environmental monitoring at MISS. In September 1985, ownership of MISS was transferred to DOE.

During 1984 and 1985, approximately 27,000 m³ (35,000 yd³) of contaminated materials were removed from the Ballod property and from 17 vicinity properties on Davison Avenue, Latham Street, Grove Avenue, and Park Way in Maywood and Rochelle Park. These materials

were stored in a protective enclosure cell at MISS. During 1985, an additional 380 m³ (500 yd³) of contaminated materials was removed from eight vicinity properties located on Avenue C, Avenue F, Hancock Street, and Trudy Drive in Lodi and another portion of the Ballod property in Rochelle Park. These materials were added to the storage pile on MISS.

Because of local opposition, no further removal action was undertaken between 1986 and 1988. However, environmental monitoring of MISS and surveying of vicinity properties continued.

In July 1991, a time-critical removal action was conducted at one residential property on Avenue C in Lodi because of significantly elevated gamma exposure rates measured inside the residence. The property was partially remediated by removing the contaminated portion of the residence.

(All previous characterization and remedial action activities will be reviewed by EPA to determine compliance with existing requirements; see Section 1.2.)

1.4 DESCRIPTIONS OF CURRENT SITE CONDITIONS

The following sections briefly describe existing conditions at each of the operable units. The descriptions are based on the information and data gathered during investigations of radioactive and chemical contamination conducted prior to this RI. The data for previous activities at vicinity properties are not summarized in this RI report.

1.4.1 Stepan Property

The Stepan property, located at 100 West Hunter Avenue in the borough of Maywood, covers 7.4 ha (18.2 acres) and consists of a series of man-made terraces on which the operating facility was constructed. The difference in elevation between the highest terrace (at the north side of the property) and the lowest terrace (at the south side) is approximately 7.5 m (25 ft). Buildings occupy approximately two-thirds of the property; some are in or near locations where the MCW thorium processing operations

occurred. The property (excluding the main office and parking area) is enclosed by a chain-link fence.

Land use in the vicinity of the property is industrial, commercial, and residential (Figure 1-9). West Hunter Avenue is lined with several small businesses, as is a portion of nearby Maywood Avenue. The area across Maywood Avenue from the Stepan property is predominantly residential. To the north and northeast, the property is bordered by a New York, Susquehanna, and Western Railroad line and numerous residential properties. Various commercial properties and MISS adjoin it to the south and southwest.

Stepan property radiological conditions

Radiological surveys of the Stepan property were conducted by EG&G (1981), the NRC (1981a,b), and Nuclear Safety Associates (Morton 1982). Several of these surveys also included the area currently known as MISS.

An aerial survey by EG&G showed the highest radiation levels to be directly over the Stepan facility, with gamma exposure rates ranging from 40 to 70 $\mu\text{R}/\text{h}$ at 1 m (3 ft) above the ground surface (EG&G 1981). Gamma exposure rates were also measured by the NRC. Thermoluminescent dosimeters were placed at various locations around the perimeter of the facility for a 6-week period, and the measured gamma exposure rates ranged from about 10 to 84 $\mu\text{R}/\text{h}$ (NRC 1981b).

Water samples were collected by NRC from two private wells in the immediate vicinity of the Stepan facility, from municipal water at the facility, and from Westerly Brook downstream of the facility. No radioactivity in excess of background levels was detected (NRC 1981a).

The NRC also conducted radiological surveys inside 14 buildings, including Building 3 (a warehouse built over burial pit 3) and Building 76 (located on the property now known as MISS) (NRC 1981b). Samples were analyzed for removable surface alpha activity; no contamination was detected in excess of the minimum

detectable alpha activity of 1 pCi/100 cm² (NRC 1981a,b). In a subsequent survey by Nuclear Safety Associates, surface samples were collected from 12 buildings and analyzed for alpha activity. Only 3 of 44 samples exhibited any detectable alpha activity, and none of these exceeded 1 dpm/100 cm² (Morton 1982). Because the NRC-recommended limit for equipment released to the public at that time was 100 dpm/100 cm² (BNI 1990a), it was concluded that none of the surface samples exhibited significant alpha activity (Morton 1982).

Gamma exposure rates measured in the buildings surveyed by Nuclear Safety Associates (excluding Building 76) were within the expected range for background exposure rates. Measurements in the production area averaged 7.8 μR/h (Morton 1982); those taken in the lawn and parking lot covering burial pits 1 and 2 (relocated thorium residues) averaged 11 and 18 μR/h, respectively. Reviewing gamma radiation measurements from the buildings and grounds, Morton concluded that employees at the plant would be unlikely to receive doses greater than 500 mrem/yr (the DOE guideline for exposure of the general public in effect at that time).

Stepan property nonradiological conditions

Nonradiological conditions at the Stepan Company property have not been previously characterized and interpreted. MCW (an NPL site) is being addressed through two separate RI/FSSs. DOE is responsible primarily for addressing radioactive contamination as well as the contaminants that meet the definition of FUSRAP waste set forth by an FFA between EPA and DOE (see Section 1.2). Stepan Company is primarily responsible for nonradioactive chemical contamination under an Administrative Order of Consent signed with EPA in 1987 and an Administrative Order signed by EPA in 1991.

Although DOE and Stepan RI/FS activities are being conducted independently, EPA oversight of both actions will ensure that sufficient coordination occurs between the parties to fully address the Maywood Site. To avoid duplication of effort, DOE, with concurrence of EPA, conducted only limited chemical sampling at the

Stepan property as part of this RI; Stepan's RI will fully address chemical contamination on the property. Results from DOE's chemical characterization efforts on the Stepan property are presented in Section 4.4.2 of this report.

Data collection during this RI focused on DOE's responsibility for cleanup of contamination under the terms of the FFA. These data will be used to complete DOE's baseline risk assessment and FS-EIS. If data relevant to DOE's responsibility are collected as part of the Stepan RI/FS, they may be used in DOE's decision-making process. EPA Region II will have primary responsibility for integration of the DOE RI/FS-EIS and the RI/FS being conducted by Stepan.

It is DOE's understanding that EPA will provide chemical data collected during the Stepan RI to DOE so that a thorough evaluation of the nature and extent of contamination can be completed to address DOE's responsibility as defined by the FFA. It is anticipated that the Stepan RI data will be made available to DOE before the DOE RI/FS-EIS documents are issued for public review.

1.4.2 Maywood Interim Storage Site

MISS is a 4.7-ha (11.7-acre) fenced area that was once part of the original MCW property. DOE obtained the property from the Stepan Company in 1985. MISS contains the interim waste storage pile, two buildings (Building 76 and a pumphouse), temporary office trailers, a reservoir, and two rail spurs. It is bounded on the west by Route 17; on the north by a New York, Susquehanna, and Western Railroad line; and on the south and east by commercial and industrial properties (Figure 1-9). Residential properties are located north of the railroad line, within 275 m (300 yd) of MISS.

The natural topography is generally flat, ranging from approximately 15 to 20 m (50 to 65 ft) above mean sea level (MSL).

The highest elevations occur in the northeastern portion of the property. Small mounds and ditches--the result of process waste disposal by MCW--are present across the site. At least two partially buried structures remain from these operations.

The interim storage pile at MISS occupies approximately 0.8 ha

(2 acres) and contains approximately 27,000 m³ (35,000 yd³) of contaminated soils and materials from removal actions conducted on vicinity properties. An area near the pile was cleared and prepared for a second interim storage pile in 1985; however, this area has never been used for storage.

MISS radiological conditions

Several radiological surveys were conducted at MCW between 1963 and 1968 to support AEC licensing activities (Jones 1987). These surveys indicated that the plant's tailings pile and slurry pile contained radioactive materials. Soil sampling and further surveys were performed by NJDEP in 1980. These activities identified the presence of thorium-232 and radium-226 in the area currently identified as MISS (NRC 1981a). Gamma readings at 1 m (3 ft) above ground level ranged from 16 to 420 μ R/h, generally increasing in an easterly direction from Route 17 toward the distribution warehouse. Maximum ground-level gamma readings approached 1,000 μ R/h (1,000 μ R/h = 1 mR/h). Soil samples collected in this area contained concentrations of thorium-232 ranging from 0.29 to 74 pCi/g and radium-226 ranging from less than 1.0 to 14 pCi/g (NRC 1981a).

Additional surveys conducted by the NRC in November 1980 (NRC 1981a) confirmed the previous reports of contamination, indicating aboveground gamma radiation levels ranging from 0.02 to 3 mR/h. In soil samples collected from areas where radiation levels exceeded 1 mR/h, thorium concentrations ranged from 700 to 3,000 pCi/g. The radioactive material, which was white or yellow and clay-like, appeared very different from the local brown-sandy soil (NRC 1981a).

An aerial radiological survey to measure terrestrial gamma radiation was performed in January 1981 over a 10-km² (3.9-mi²) area centered on the Stepan property (EG&G 1981). Gamma readings at 1 m (3 ft) above ground level ranged from 40 to 70 μ R/h. In May 1981, NRC inspectors surveyed the interior of Building 76, which is adjacent to the former thorium processing area. Indoor

radiation levels ranged from 0.06 to 0.2 mR/h; smear surveys showed no detectable removable contamination (NRC 1981b).

Nuclear Safety Associates conducted a comprehensive survey of the Stepan property and MISS in June 1981 (Morton 1982). Elevated gamma levels were measured in the southwestern portion of the field between Route 17 and the western rail spur (460 μ R/h, maximum), in an area in the northwestern quadrant of MISS (250 μ R/h, maximum), and along the northern fenceline (200 μ R/h).

From May through August 1986, BNI conducted radiological and limited chemical characterization studies of MISS. Results confirmed that thorium-232 is the primary radioactive contaminant at MISS, although elevated concentrations of radium-226 and uranium-238 were also detected (BNI 1987a). These elevated levels of radium-226 and uranium-238 are generally less than the concentration of thorium-232. In some cases, radium-226 concentrations above DOE cleanup guidelines have been detected. One measurement taken in the center of Building 76 indicated an ambient radon-222 concentration of 0.5 pCi/L. This measurement did not confirm the presence of contamination under the building; however, the ambient external exposure rate of 85 μ R/h at 1 m (3 ft) above ground level is believed to result from the high radionuclide concentrations directly to the east of and beneath the structure (BNI 1987a).

Near-surface gamma measurements for MISS ranged from approximately 5,000 to 994,000 cpm (BNI 1987a). A measurement of 11,000 cpm is approximately equal to the DOE guideline of 5 pCi/g for acceptable residual thorium-232 concentration in surface soil.

Biased surface soil samples collected from 13 locations were analyzed for uranium-238, thorium-232, and radium-226 (BNI 1987a).

In some samples, the concentrations of thorium-232 and radium-226 exceeded current DOE guidelines for acceptable levels of residual contamination in soils (see Appendix A). Radium-226 concentrations ranged from 1.7 to 7.9 pCi/g; thorium-232 concentrations ranged from 3.3 to 95.2 pCi/g. The maximum uranium-238 concentration was 68.7 pCi/g.

Downhole gamma logging of boreholes was performed, with

measurements ranging from about 2,000 to 4,300,000 cpm (BNI 1987a).

It has been demonstrated that under ideal conditions [i.e., at a facility such as the Technical Measurements Center (TMC) in Grand Junction, Colorado, where detection instruments are calibrated], a measurement of 40,000 cpm is approximately equivalent to 15 pCi/g for subsurface thorium-232. However, because field conditions are far less than ideal (i.e., radioactive contamination is not usually uniformly distributed in a borehole), data from early characterization activities were reviewed, and a more conservative correlation was established; this is discussed in more detail in Section 2.2.1). Based on field conditions, a measurement of 30,000 cpm has been determined to be approximately equal to 15 pCi/g for subsurface thorium-232 contamination (see Appendix A).

Subsurface soil samples were also collected and analyzed for uranium-238, thorium-232, and radium-226. Uranium-238 concentrations ranged from less than 7 to 304 pCi/g; thorium-232 and radium-226 concentrations ranged from 1 pCi/g (background for these radionuclides in the Maywood area) to 1,699 pCi/g and 447 pCi/g, respectively (BNI 1987a).

Results of the 1986 radiological characterization indicate that virtually all areas of the DOE-owned MISS are radioactively contaminated in excess of DOE guidelines. The areas and depths of radioactive contamination are shown in Figure 1-10. Because the entire area of MISS is covered by grass, gravel, or the interim storage pile, the potential for contaminants migrating offsite by surface water runoff is low. There is also little potential for migration of subsurface contaminants in groundwater because of the low solubility of thorium-232 as thorium phosphate (the primary form present in MCW waste) in water. In addition, surface water, sediments, groundwater, and air at MISS are routinely sampled as part of DOE's environmental monitoring program, and samples are analyzed for chemical and radiological parameters (as summarized in the following paragraphs). To protect human health and the environment, DOE also employs engineering and institutional controls such as limited and controlled access, fencing, the routine monitoring program, and the engineered nature of the interim storage pile, which is underlain by a geomembrane liner,

contains a leachate collection system, and is overlain by a geomembrane cover.

DOE's continuing environmental monitoring program, conducted since 1984, monitors the site and collects information on radiological and chemical conditions at MISS and vicinity properties (including the Stepan property). This monitoring program has been structured around quarterly sampling regimes. The program has included quarterly radiological sampling of the surface water drainage paths, including sediments, and analysis of the samples for total uranium, radium-226, and thorium-232. Surface water sampling locations are based on migration potential and discharge routes from MISS. Because surface water runoff discharges underground to a storm sewer via Westerly Brook, samples are collected both upstream and downstream. Annual average concentrations of total uranium, radium-226, and thorium-232 in surface water at MISS have remained at background levels since 1984 (BNI 1985e, 1986a, 1987b, 1988j, 1989a, 1990b, 1991a).

Groundwater samples have been collected quarterly since 1985 from monitoring wells on and in the immediate vicinity of MISS. The monitoring well network included 15 wells from 1985 through 1988, 23 wells during 1989 and 1990, and 33 wells during 1991. As additional wells were installed, they were added to the monitoring network. Periodically, low groundwater conditions and low recovery volumes precluded sample collection from all of the wells in the network.

Groundwater samples were collected quarterly and analyzed for gross indicator parameters and radioactive constituents. Generally, the concentrations of total uranium, thorium-232, and radium-226 are higher in groundwater from the unconsolidated sediments than in groundwater from the bedrock.

Thorium-232 and radium-226 have remained relatively stable at concentrations equivalent to or near those found in upgradient wells throughout the period. Uranium concentrations, however, have been quite variable, exhibiting no definite trend. None of these analytes have been detected at concentrations greater than 10 percent of DOE derived concentration guides (DCGs). A DCG is defined as the concentration of a radionuclide in air or water

that, under continuous exposure for one year by one exposure mode (e.g., ingestion of water or inhalation), would result in an effective dose equivalent of 100 mrem. It should be noted that the DOE DCG has been established in units of mrem, and actual measurements from the monitoring program are expressed in units of milliroentgens (mR); 1 mrem is approximately equal to 1 mR. (See Appendix A for a complete list of the DCGs.)

MISS has also been monitored for radon (radon-222), thoron (radon-220), and external gamma radiation in air. From 1986 to 1990, average external gamma radiation exposure rates ranged from 20 to 331 mR/yr, with the higher values occurring in areas of known contamination. Some individual measurements along the perimeter of MISS were above DOE's limit of 100 mrem/yr. However, the average exposure rate for the MISS perimeter is 60 mR/yr, which is below the DOE DCG. Also, under conservative but realistic exposure scenarios, no individual would be expected to receive an actual exposure above the 100 mrem/yr limit. Radon and thoron concentrations for 1985, which were the lowest recorded at MISS, were significantly lower than concentrations for other monitoring years (BNI 1989a). Differences in concentrations for other monitoring years were not statistically significant.

Concentrations at fence line locations 5 (near the northeast corner of the interim storage pile) and 10 (along the southern boundary of the property), which are near known areas of contamination, were significantly higher than at other locations, possibly as a result of disturbances to soil cover near these areas in 1986. Although clean fill material was placed near these locations in 1987, the concentrations of both radon and thoron increased during that year.

The increase is thought to be related to the drought in the Northeast during 1987, which increased soil porosity and allowed more gas to be emitted (BNI 1989a).

MISS nonradiological conditions

Because MISS was once a part of the original MCW property, the presence of chemical contaminants has been suspected (Jones 1987).

During BNI's 1986 radiological characterization of MISS, limited

chemical sampling was performed. Additional chemical sampling to supplement the 1986 findings was performed during this RI, and resulting data are presented in Section 4.0.

In 1986, soil samples for chemical analysis were collected from the same locations as the subsurface soil samples taken for radiological analysis. The samples were analyzed for volatile organic compounds (VOCs), semivolatile organic compounds, metals, pesticides, and polychlorinated biphenyls (PCBs). Maximum VOC concentrations detected were 88 ppb for methylene chloride, 11 ppb for acetone, less than 5 ppb for benzene, and less than 13 ppb for toluene. No organic compounds are known to have been used in thorium processing. Because of quality control problems, and because methylene chloride and acetone are common laboratory contaminants, the presence of methylene chloride and acetone may have resulted from contamination during subsequent laboratory analysis (BNI 1987a).

Analysis for base/neutral and acid extractables (BNAEs) was performed to determine the extent of semivolatile organic contamination. Although several semivolatiles were identified, concentrations were lower than the detection limits specified by the laboratory method used for the analysis. The maximum concentrations approximated for some semivolatiles seemed to cluster in an area east of Building 76 where radioactive contamination was also found. The analysis for PCBs in these soils yielded negative results (BNI 1987a).

Results of metals analyses indicated that the following metals exceeded the range for background concentrations in soil: antimony, arsenic, cadmium, chromium, copper, lead, mercury, selenium, thallium, and zinc (Table 1-3). The soil samples did not exhibit hazardous waste characteristics as defined by the Resource Conservation and Recovery Act (RCRA)--i.e., ignitability, reactivity, corrosivity, and extraction procedure (EP) toxicity. EP toxicity is a characteristic formerly assigned to hazardous wastes when leachate concentrations of constituents exceeded designated thresholds in a test specified in 40 CFR 261, Appendix II. EP toxicity has been replaced by the toxicity characteristic leaching procedure (TCLP) as specified in the NCP

(EPA 1990).

Groundwater samples have been collected and analyzed for volatile and semivolatile organic compounds annually since 1985. In addition, during 1985 and 1990, groundwater samples were analyzed for metals.

Both volatile and semivolatile organic compounds have been detected in groundwater samples from the site. Maximum Contaminant Levels (MCLs) specified in the Safe Drinking Water Act (SDWA) for some of the VOCs have been exceeded in various wells. VOCs were not detected in the background wells. MCLs for tetrachloroethene and trichloroethene were exceeded in groundwater samples from onsite wells along the western boundary of MISS; the MCL for benzene was exceeded in a well along the northern site boundary. MCLs for dichloroethene, benzene, and vinyl chloride were exceeded in a well east of MISS on the Stepan property. In wells on the Ballod property, offsite and downgradient of MISS, MCLs were exceeded for tetrachloroethene, trichloroethene, dichloroethene, and vinyl chloride. The predominant organic compounds detected are halogenated solvents, dry cleaning agents, or chemical degradation products.

Analytical results for metals indicated localized areas of elevated concentrations of total and dissolved arsenic, boron, chromium, and lithium.

1.4.3 Residential Vicinity Properties

Several residential vicinity properties in Maywood, Lodi, and Rochelle Park are known to have been radioactively contaminated, primarily because contaminated fill from the former MCW property was used on these vicinity properties or because sediments from MCW discharged into the former Lodi Brook and were deposited downstream. These properties were designated by DOE for inclusion in FUSRAP through surveys performed by ORNL (ORNL 1981a-g, 1986a).

At the time of this RI, 25 of the 55 residential properties designated by DOE for remediation had been fully decontaminated (Table 1-2). Twenty-three residential properties in Lodi have been characterized but remain to be remediated (Table 1-2). The

description of radiological conditions (below) is based on these earlier characterizations.

Eight residential properties were investigated during the RI. Two are located in Maywood; one has been designated, and the other was investigated because contamination appeared to extend onto it from the adjacent Stepan property. The remaining six designated properties are located in Lodi. Results of the RI activities performed on these properties are presented in Section 4.0.

Residential vicinity properties radiological conditions

On the 23 properties characterized prior to the RI but not yet remediated, peak concentrations in surface soils [first 15 cm (6 in.)] were 58.3 pCi/g for thorium-232 (BNI 1989r), 11.8 pCi/g for radium-226 (BNI 1989v), and 26.7 pCi/g for uranium-238 (BNI 1989i). In subsurface soils on these properties, the peak concentrations were 59.2 pCi/g for thorium-232 (BNI 1989v), 5.6 pCi/g for radium-226 (BNI 1989i), and 37.4 pCi/g for uranium-238 (BNI 1989k). Contamination was detected at depths as great as 2.9 m (9.5 ft) (BNI 1989i).

Maximum exposure rates were 49 μ R/h outdoors (BNI 1989q) and 15 μ R/h indoors (BNI 1989d). Indoor radon levels measured as high as 4.0 pCi/L (BNI 1989p) and 0.008 WL (BNI 1989j); the highest indoor thoron level was 0.004 WL (BNI 1989p,j).

Residential vicinity properties nonradiological conditions

Prior to this RI, no sampling had been performed to characterize the extent of nonradioactive contamination on the residential vicinity properties.

1.4.4 Commercial/Governmental Vicinity Properties

Surveys of commercial/governmental vicinity properties conducted by NJDEP and the NRC in 1980 and 1981 established that thorium-232 and radium-226 contamination was present in soils on

the Ballod property. An aerial survey commissioned by the NRC confirmed these findings and identified additional nonresidential sites of contamination to the southeast (EG&G 1981). Other walkover surveys identified additional commercial/governmental properties as being radioactively contaminated.

At the time of this RI, 23 commercial/governmental properties had been characterized (Table 1-2). In addition, a partial removal action had been conducted on the Ballod property, the northeast corner of which remains contaminated. Five commercial/governmental properties were also investigated during the RI. One commercial property was radiologically surveyed because contamination appeared to extend onto it from the adjacent Stepan property; the remaining four properties were designated through ORNL surveys. Results of the RI activities are discussed in Section 4.0. The discussion of radiological conditions (below) is based on the earlier characterizations.

Commercial/governmental vicinity properties radiological conditions

On the commercial/governmental properties characterized before this RI, maximum thorium-232 concentrations in soil were 3,975 pCi/g on the Ballod property (from which contaminated soil was subsequently removed) (NRC 1981b) and 180 pCi/g on the remaining properties (BNI 1987c). Radium-226 concentrations in soil were as high as 37 pCi/g on the Sears Distribution Center property (BNI 1987c). A uranium-238 concentration of 80.2 pCi/g was measured in the drainage ditch running adjacent to the DeSaussure property (BNI 1989c). In addition, soil samples were collected from two boreholes in Lodi Municipal Park during 1987 characterization activities to confirm gamma log data. Thorium-232 concentrations in these two samples ranged from <1.0 to 31.4 pCi/g (the highest at a depth of 1.8 to 2 m (6 to 7 ft)). These data confirmed gamma log results recorded in the 1986 and 1987 characterization activities on this property.

Gamma exposure rates up to 146 μ R/h (including background) were measured outdoors (BNI 1989c); the highest indoor measurement was

13 μ R/h (BNI 1989c,x). In the 1988 annual environmental report, the 4-year average background exposure rate for the area was reported to be approximately 9 μ R/h (BNI 1989a).

Indoor radon and thoron levels were measured in buildings on the commercial/governmental properties. The highest radon measurement was 2.2 pCi/L (BNI 1987c), the highest radon decay product level was 0.005 WL (BNI 1989x), and the highest thoron radon decay product level was 0.003 WL (BNI 1987g, 1989x). EPA has set an indoor remedial action guideline of 0.02 WL for radon (see Appendix A). The corresponding thoron remedial action guideline would be 0.06 WL. When a hole was cut through the floor of the warehouse on the Sears commercial property, the subfloor radon-222 level 72 hours after drilling was 300 pCi/L (BNI 1987c).

Commercial/governmental vicinity properties nonradiological conditions

Chemical characterization of the commercial/governmental vicinity properties generally has been limited to the larger properties (Kannard 1986a; Ebasco 1987, 1988; Leichtweis 1987; BNI 1987c,d,f,g). Studies were undertaken in 1986 at the Hunter-Douglas, Sears, Scanel, and Sunoco Station properties to determine whether RCRA-hazardous waste was mixed with radioactive waste and to provide information needed to develop health and safety plans for future removal actions.

At the Hunter-Douglas property, soil samples collected to a depth of approximately 5 m (16 ft) from a single borehole on the property were composited and analyzed for VOCs, semivolatile organic compounds, metals, pesticides, PCBs, and RCRA-hazardous waste characteristics (BNI 1987d). No VOCs were present in the composite sample; however, the data are suspect because the holding time for VOC analyses was exceeded by the analytical laboratory and the sample submitted was a composite rather than a discrete sample.

Three semivolatile compounds were identified [naphthalene,

2-methylnaphthalene, and bis(2-ethylhexyl)phthalate]; however, concentrations were below the analytical laboratory's detection limits of 880 ppb, 88 ppb, and 30 ppb, respectively. No PCBs or pesticides were detected. Concentrations of metals in soil were typical of background concentrations. All EP toxicity concentrations for both metals and pesticides were less than the criteria specified in 40 CFR 261.24 at the time of the analysis. These samples also did not exhibit the RCRA characteristics of corrosivity, reactivity, or ignitability as specified in 40 CFR 261.21, 261.22, and 261.23.

Sampling activities at the Sears property included the collection of soil samples to a depth of approximately 5 m (16 ft) (BNI 1987c). These samples were composited and analyzed for the same parameters as those from the Hunter-Douglas property. The evaluation of VOC data from the sampling at Sears is of limited value because samples were composited rather than taken at discrete intervals, and holding time protocols for all VOC analyses were exceeded by the analytical laboratory. Two VOCs, methylene chloride and acetone, were detected at concentrations exceeding the laboratory's specified detection limit; however, their detection may be an artifact of the sampling and analytical procedures. Two other VOCs, methyl ethyl ketone and ethyl benzene, were identified at concentrations less than the laboratory's specified detection limit. On two occasions, subsurface containers were apparently penetrated during drilling operations; however, no actual evidence of buried drums was recorded. Therefore, a conservative assumption was made that subsurface containers were indeed located on the property. Significant concentrations of the following VOCs were identified in the sludge material taken from the boreholes: benzene, 120 ppm; toluene, 240 ppm; and xylene, 1,200 ppm. These chemicals are constituents of petroleum-based products (i.e., gasoline), and a slight gasoline odor was detected in the 2- to 2.5-m (6- to 8-ft) soil sampling interval. In the fall of 1992, trenching activities were conducted on the Sears Distribution Center property to confirm the presence of these subsurface containers. During these activities, more than 50 buried drums were discovered. Full details and locations of the buried drums

found during the trenching activities will be included in the report for the Stepan RI being conducted under a consent order between Stepan and EPA.

Fifteen semivolatile compounds were identified in soils on the Sears property. These were phenol, 190 ppb; 2-chlorophenol, 170 ppb; 1,4-dichlorobenzene, 74 ppb; N-nitroso-di-n-propylamine, 92 ppb; 1,2,4-trichlorobenzene, 80 ppb; 4-chloro-3-methylphenol, 210 ppb; acenaphthene, 97 ppb; 4-nitrophenol, 420 ppb; 2,4-dinitrotoluene, 89 ppb; pentachlorophenol, 260 ppb; pyrene, 90 ppb; naphthalene, 80 ppb; 2-methylnaphthalene, 88 ppb; benzoic acid, 8,000 ppb; and bis(2-ethylhexyl)phthalate, 27 ppb. The majority of these compounds were found in samples collected adjacent to the DeSaussure building. No PCBs were detected. The pesticides hexachlorocyclohexane and dichlorodiphenyltrichloroethane (DDT) were measured in one sample at concentrations commonly found in agricultural soils. The metals antimony, cadmium, copper, lead, thallium, and zinc exceeded the range for published nationwide background concentrations in soil (Braunstein 1981). However, samples did not exhibit RCRA characteristics specified in 40 CFR 261.21, 261.22, 261.23, and 261.24 at the time of analysis.

Subsurface soil composites obtained from the Scanel and Sunoco Station properties were analyzed for VOCs and semivolatile organic compounds, PCBs and pesticides, metals, and RCRA characteristics. None of the samples from either property exhibited characteristics of RCRA waste. Some samples contained slightly elevated concentrations of lithium, titanium, and semivolatile compounds (Kannard 1986a; BNI 1987f). Data from the VOC sampling at both these properties is of limited value because the samples were composited rather than taken at discrete intervals, and holding time protocols for the VOC analyses were exceeded by the analytical laboratory.

1.5 REPORT ORGANIZATION

This RI report is organized in a format similar to the outline suggested in the Guidance for Conducting Remedial Investigations

and Feasibility Studies Under CERCLA (EPA 1988a). Section 1.0 states the purpose of the report and includes a brief description of the site, site history, and previous radiological and chemical investigations. Section 2.0 summarizes investigations performed to assess various physical and chemical characteristics of the site, detailing the activities performed and the rationale for doing them. Section 3.0 summarizes findings of the work performed to characterize physical site features relevant to assessing site contamination. Results of the field investigation to determine the nature and extent of contamination are presented in Section 4.0; the fate and transport of contaminants in various media from the site are described in Section 5.0. Section 6.0 outlines the baseline risk assessment process to be implemented for the Maywood Site, and Section 7.0 summarizes the results and conclusions derived from the 1990-1991 RI field activities and identifies future work to be performed at the site. Figures and tables for each section are presented at the end of the section to minimize interruptions in the flow of the text.

This report is supplemented by several appendixes:

- Appendix A summarizes DOE guidelines for residual radioactive material.
- Appendix B summarizes technical specifications for the installation of boreholes and monitoring wells.
- Appendix C contains radiological data, chemical data, and geologic logs for soil at the Stepan property.
- Appendix D contains chemical data and geologic logs for soil at MISS (storage pile and onsite).
- Appendix E contains radiological data, chemical data, and geologic logs for soil at the residential vicinity properties.
- Appendix F contains radiological data, chemical data, and geologic logs for soil at the commercial/governmental vicinity properties.
- Appendix G is a field investigation report on the smoke test

of sewer lines at MISS.

- Appendix H contains data pertaining to concentrations of metals and rare earths in groundwater.
- Appendix I discusses data quality.
- Appendix J contains hydrogeologic logs.
- Appendix K contains background data for chemical constituents in soil.

FIGURES FOR SECTION 1.0

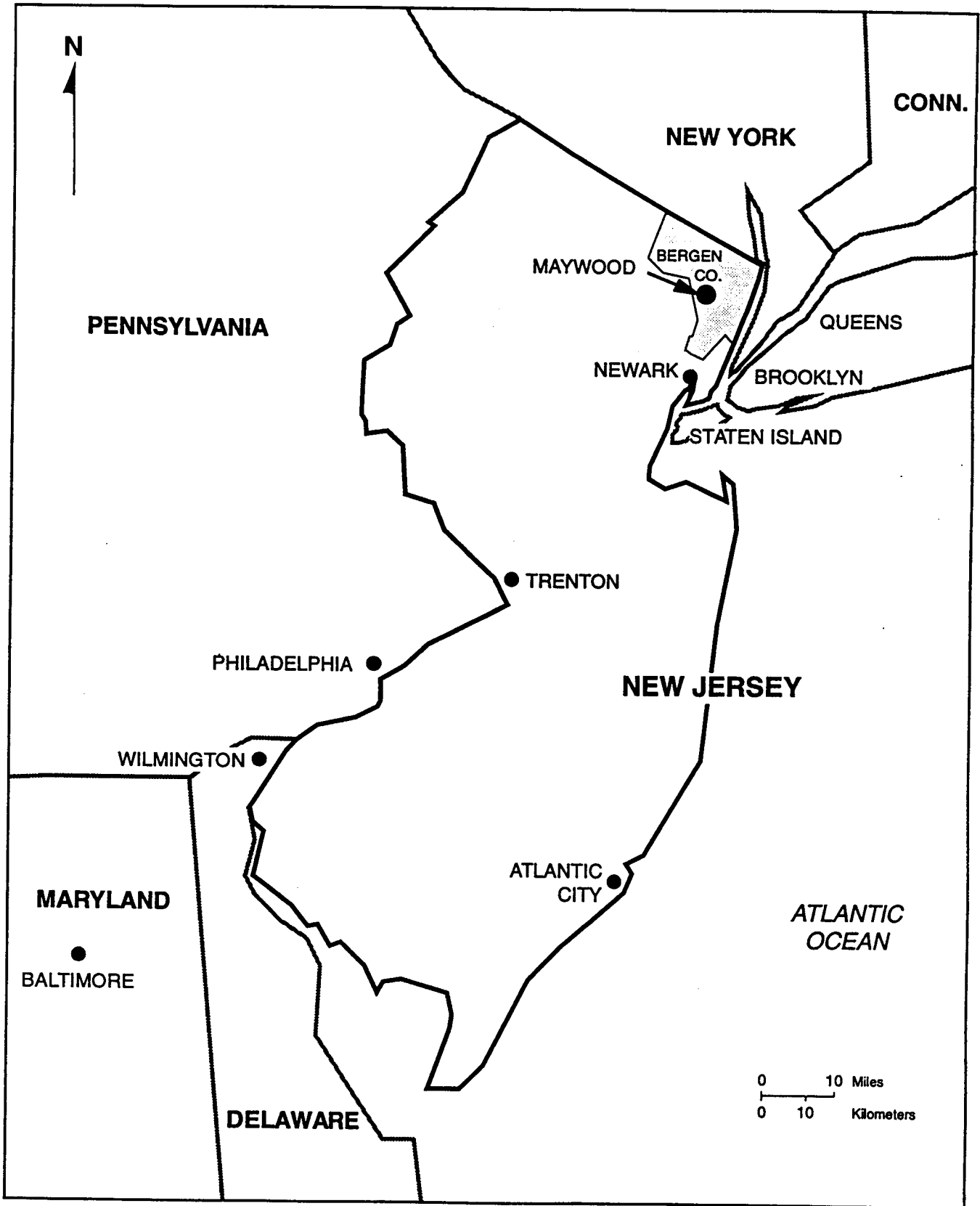


Figure 1-1
 Location of Maywood, Bergen County, New Jersey

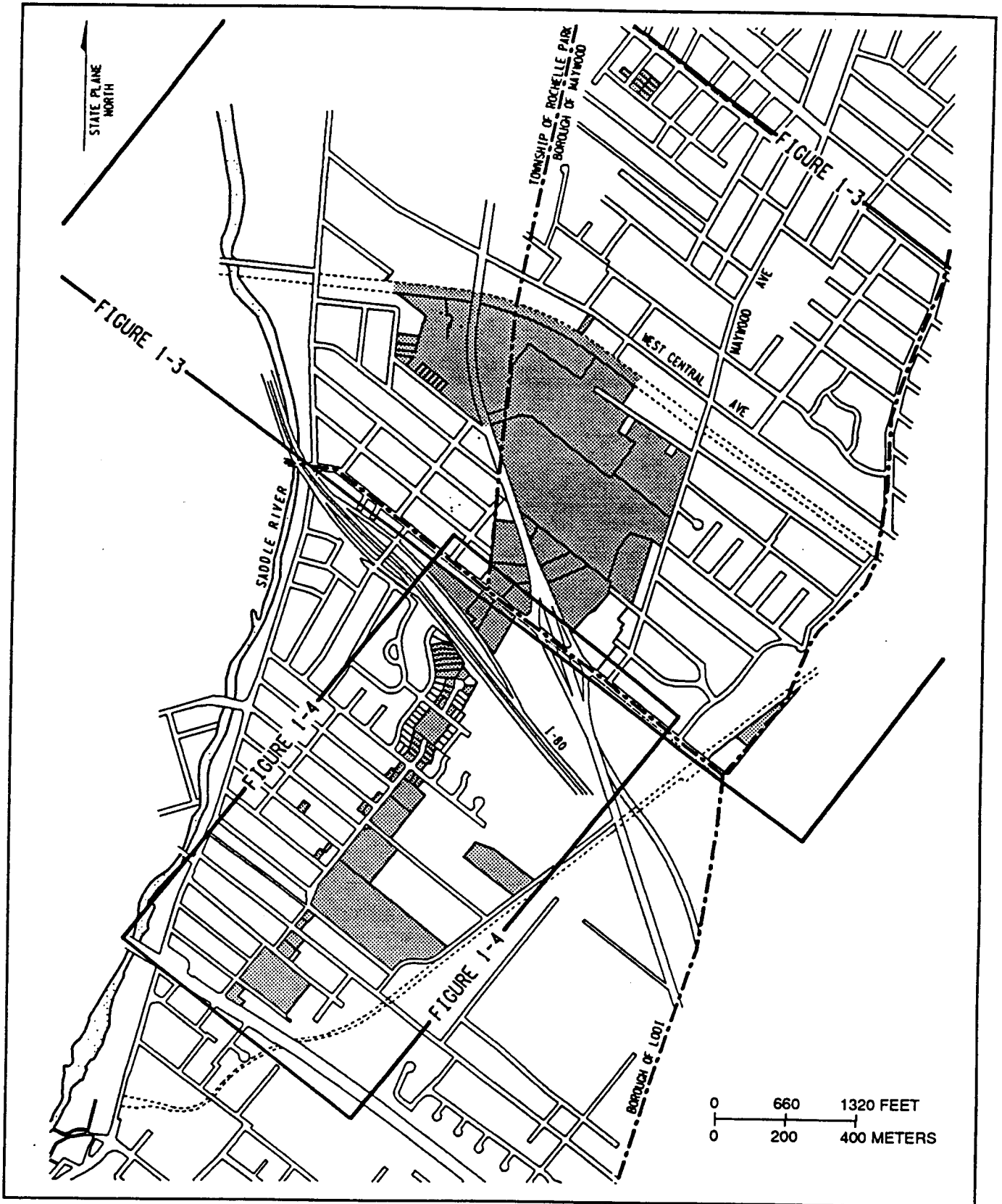
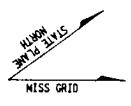
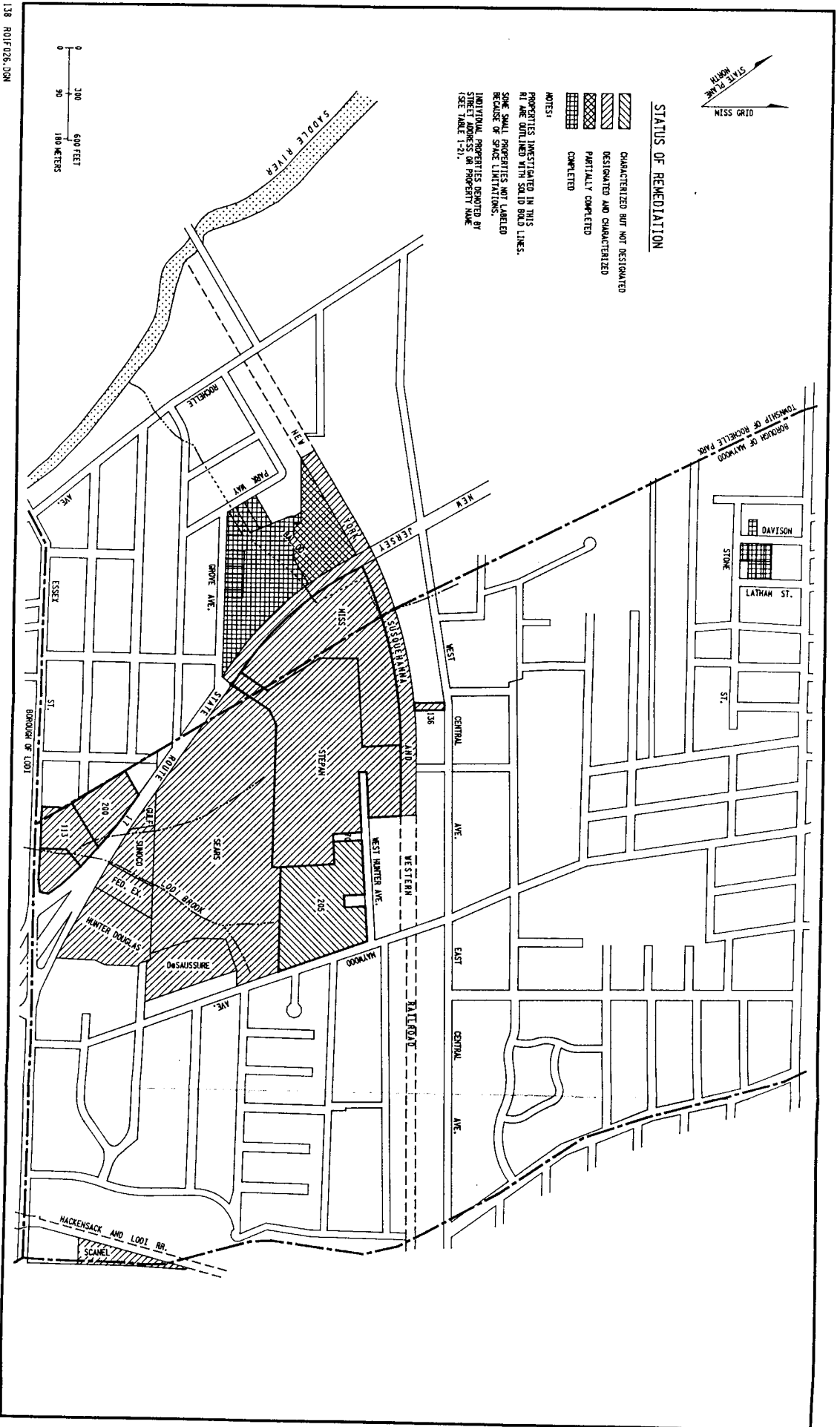


Figure 1-2
 Locations of the Properties That Comprise
 the Maywood Site



STATUS OF REMEDIATION

- CHARACTERIZED BUT NOT DESIGNATED
- DESIGNATED AND CHARACTERIZED
- PARTIALLY COMPLETED
- COMPLETED

NOTES:
 PROPERTIES INVESTIGATED IN THIS
 MAP ARE OUTLINED WITH SOLID BOLD LINES.
 SOME SMALL PROPERTIES NOT LABELED
 BECAUSE OF SPACE LIMITATIONS.
 INDIVIDUAL PROPERTIES REPORTED BY
 STREET ADDRESS OR PROPERTY NAME
 (SEE TABLE 1-2).

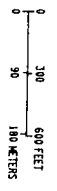
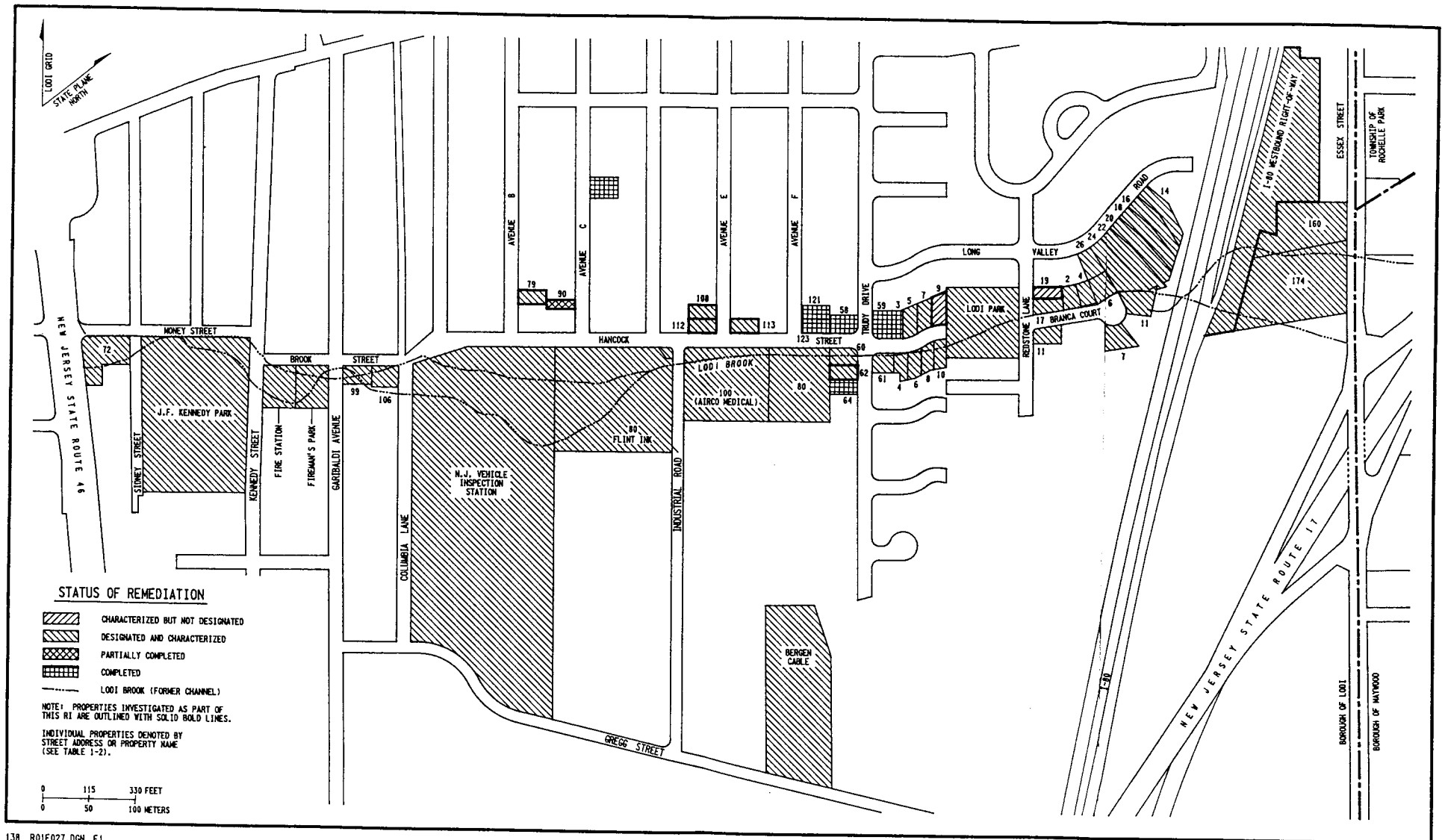


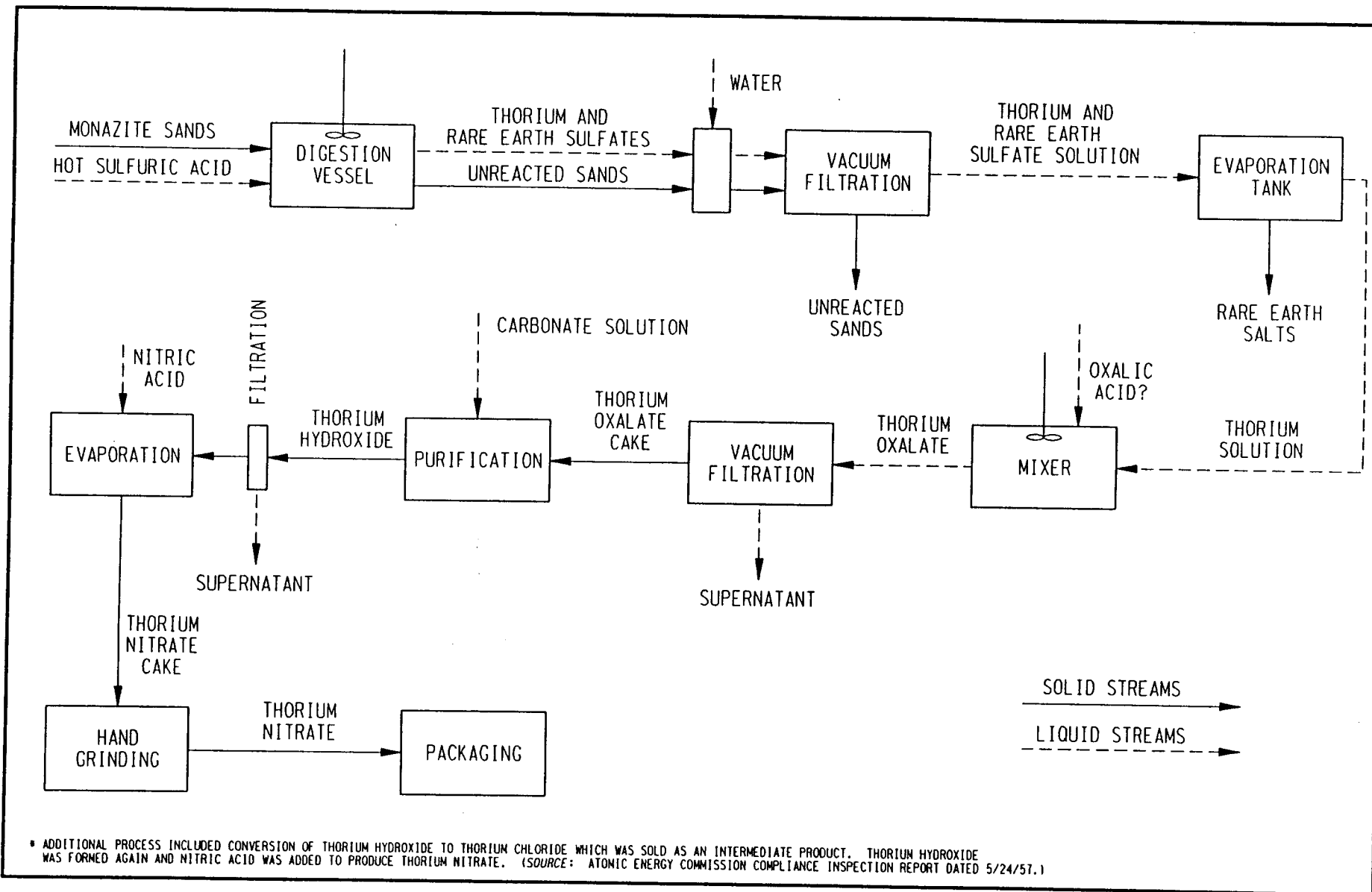
Figure 1-3
 Locations and Status of Properties in Maywood and Rochelle Park



138 R01F027.DGN F1

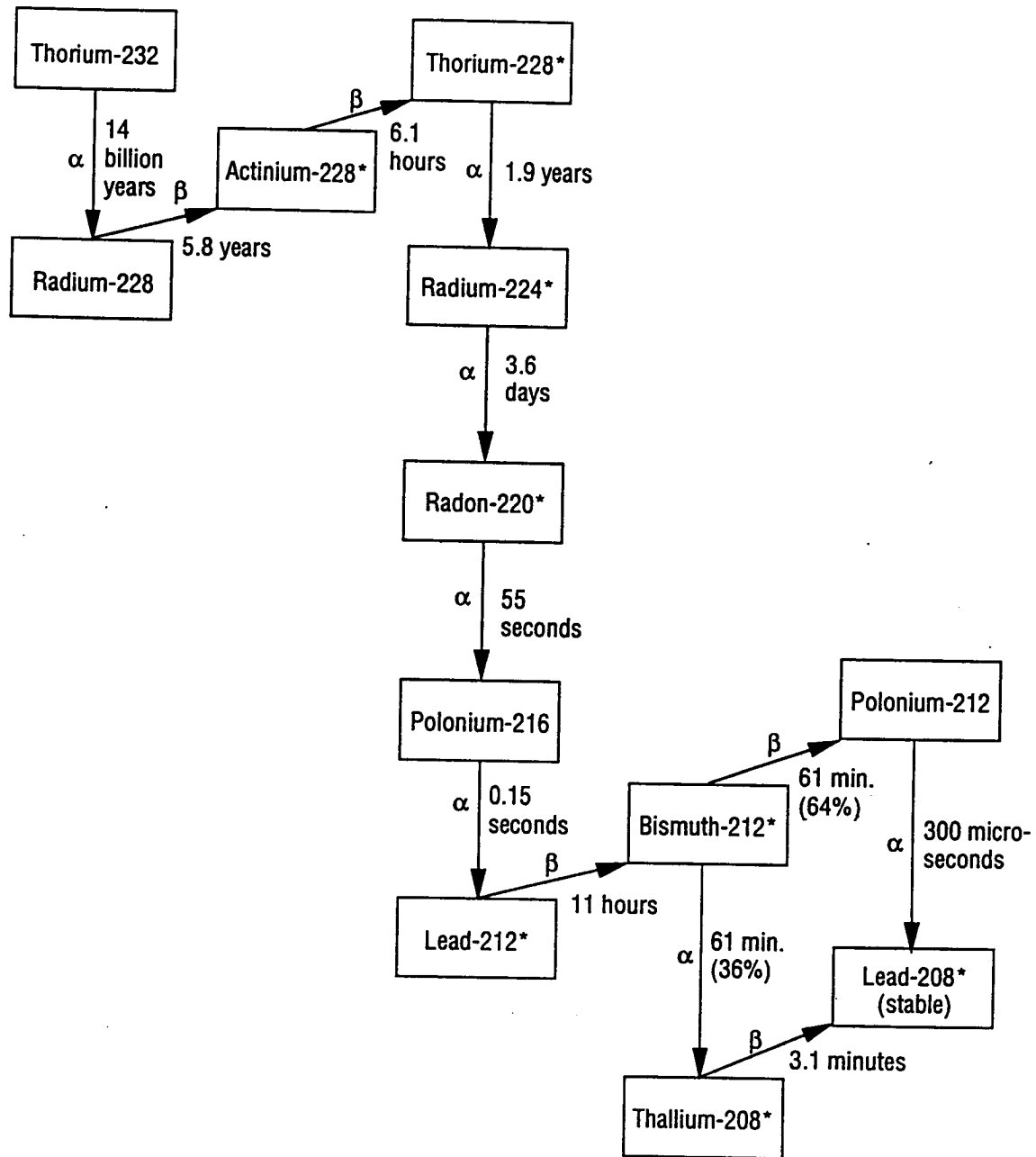
Figure 1-4
Locations and Status of Properties in Lodi

1-37



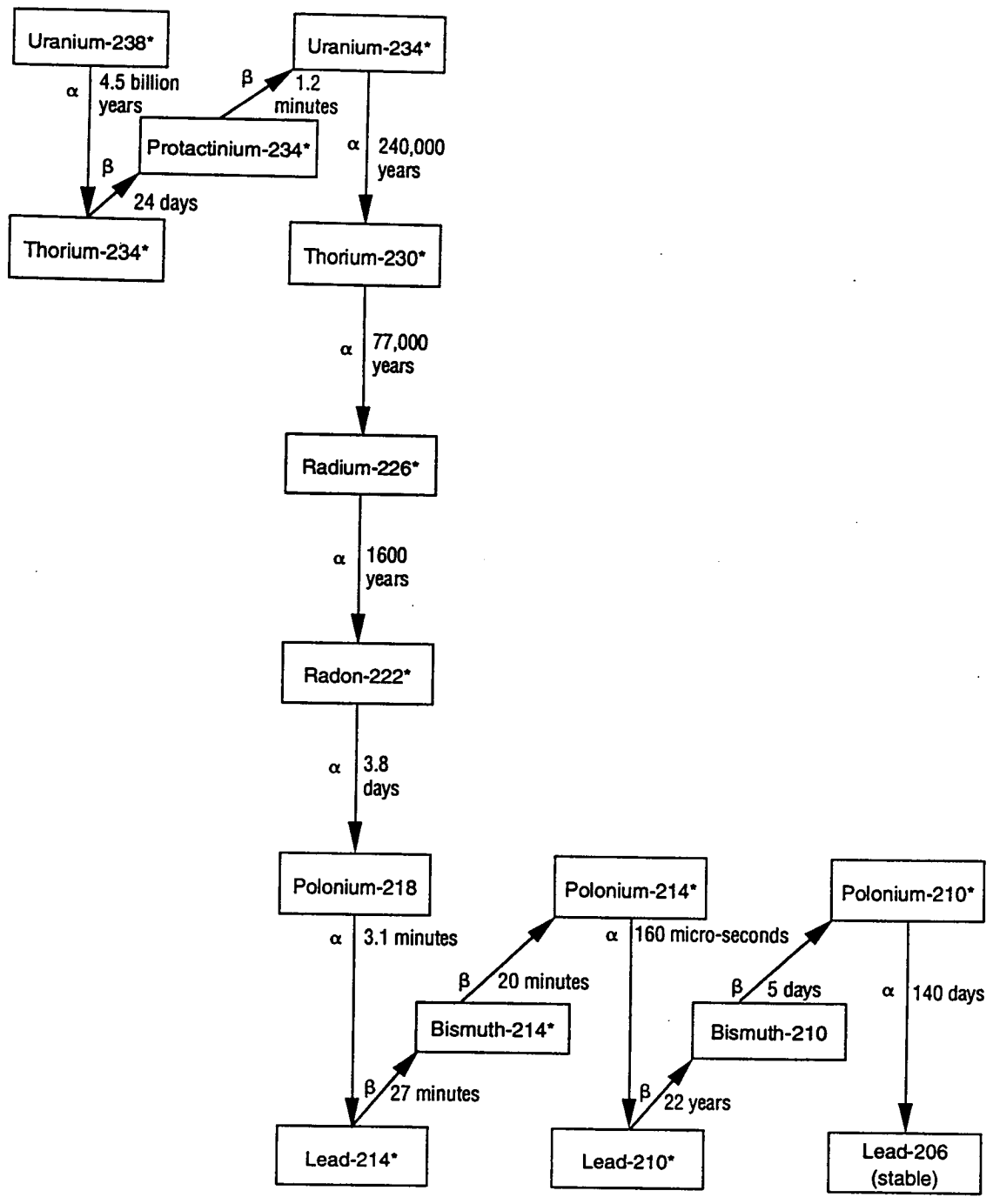
138 R01F002.DGN

Figure 1-5
 Process Possibly Used to Produce Mantle-Grade Thorium Nitrate at MCW



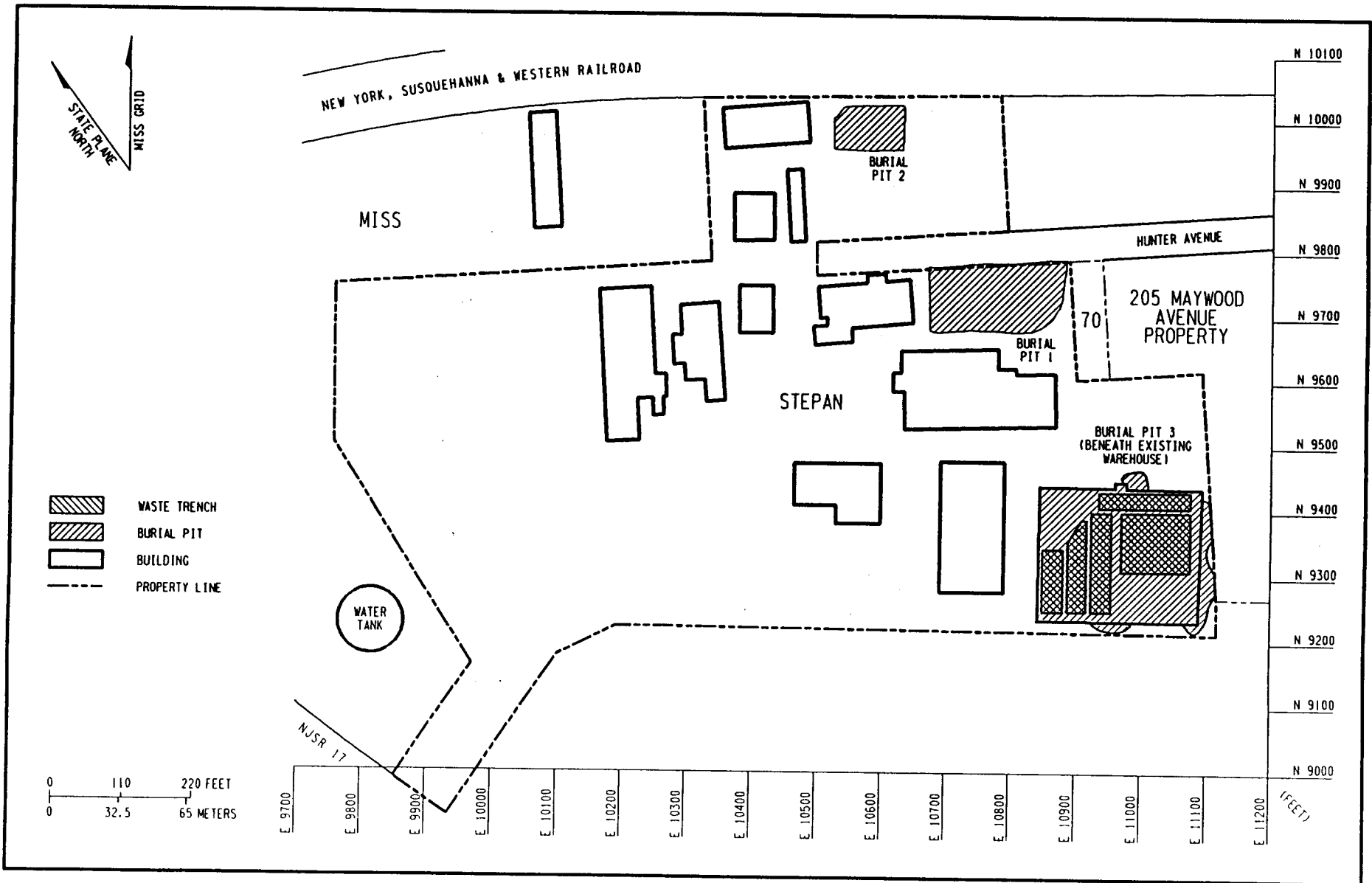
NOTES:
 Only dominant decay mode is shown.
 Times shown are half-lives.
 Symbols α and β indicate alpha and beta decay, respectively.
 Asterisk indicates that isotope is also a gamma emitter.

Figure 1-6
 Thorium-232 Radioactive Decay Series



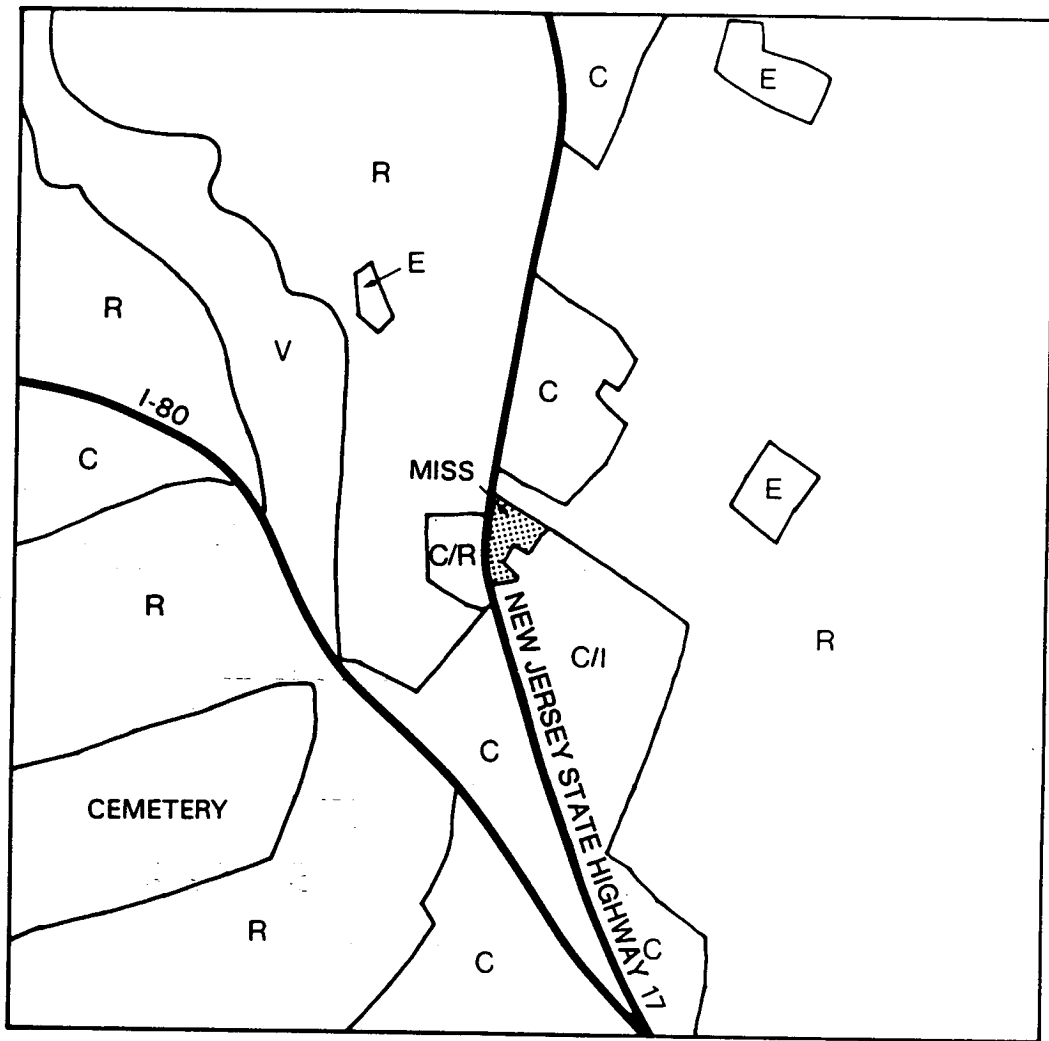
NOTES:
 Only dominant decay mode is shown.
 Times shown are half-lives.
 Symbols α and β indicate alpha and beta decay, respectively.
 Asterisk indicates that isotope is also a gamma emitter.

Figure 1-7
 Uranium-238 Radioactive Decay Series



138 R01F033.DGN

Figure 1-8
Burial Pit Locations on the Stepan Company Property



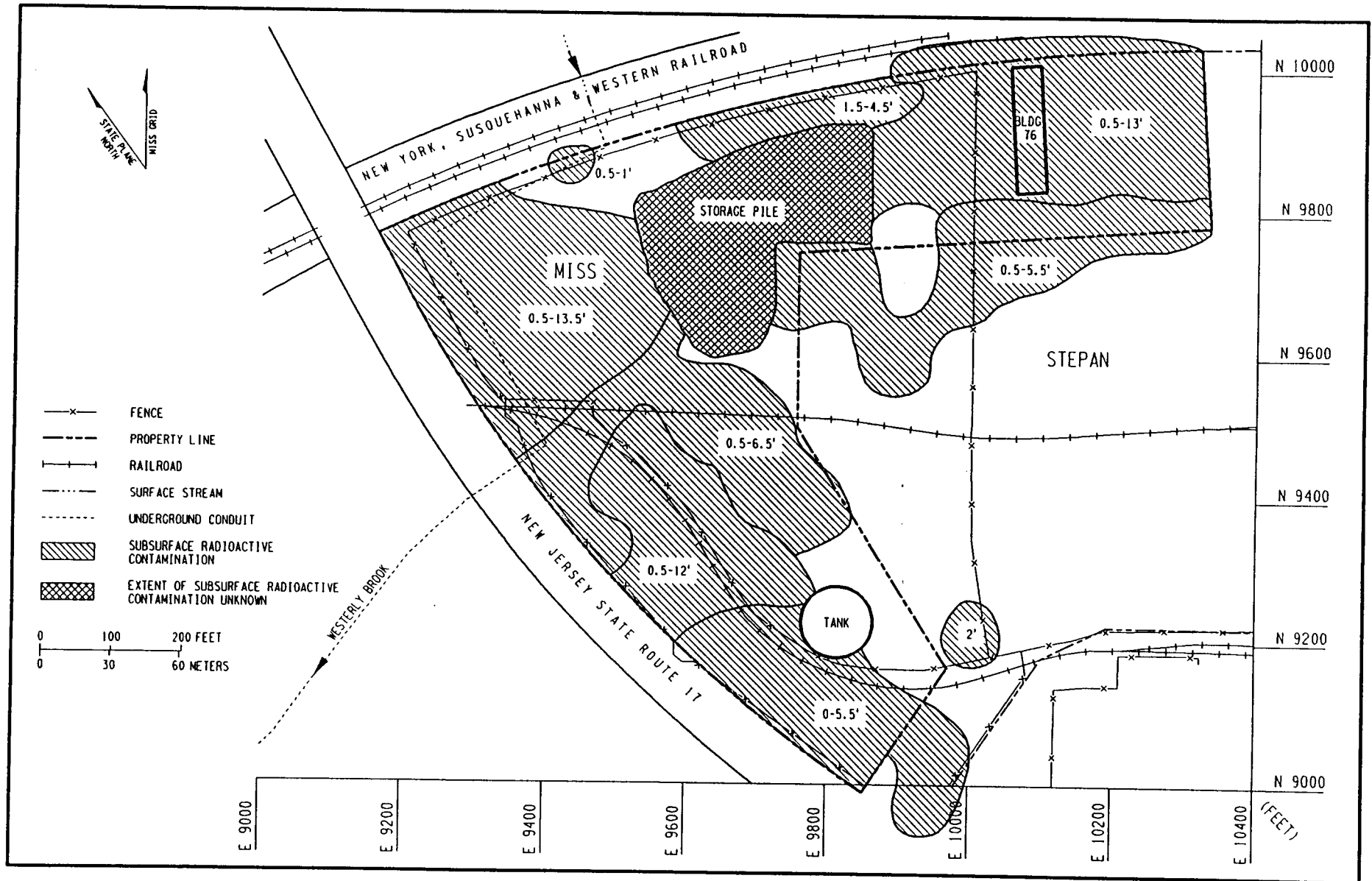
BASED ON AERIAL PHOTOGRAPHS, SITE VISITS AND USGS TOPOGRAPHIC MAP 1:24000 SCALE, HACKENSACK, NJ QUADRANGLE (PHOTO REVISED 1981)

- | | |
|---------------------------------|----------------------------------|
| R RESIDENTIAL | E EDUCATIONAL |
| C COMMERCIAL | V VACANT |
| C/I MIXED COMMERCIAL/INDUSTRIAL | C/R MIXED COMMERCIAL/RESIDENTIAL |

0 ————— 0.5 MI
 0 ————— 0.8 KM



Figure 1-9
 Generalized Land Use in the Maywood Site Area



138 ROIF003.DGN F3

Figure 1-10
MISS Areas and Depths of Radioactive Contamination

TABLES FOR SECTION 1.0

Table 1-1
Dose Conversion Factors for Uranium and Thorium Decay
Series Radionuclides of Major Concern

Radionuclide	Committed Effective Dose Equivalent Conversion Factor ^a Equivalent (rem/ μ Ci) Conversion		Radionuclide	Effective Dose Factor (rem/WLM) ^d
	Ingestion ^b	Inhalation ^c		
Actinium-228	0.002	0.13	Radon-222	1
Protactinium-234m	0.002	0.0008	Radon-220	0.33
Radium-228	1.44	4.77		
Radium-226	1.32	8.58		
Radium-224	0.37	3.16		
Thorium-234	0.014	0.035		
Thorium-232	2.73	1,151		
Thorium-230	0.55	262		
Thorium-228	0.40	342		
Uranium-238	0.25	118		
Uranium-234	0.28	132		

^aAccumulated dose for 50 years following intake.

^bWhen the reference source allowed a choice of fractional uptake, the most restrictive fraction was selected. Fractional uptake is the fraction of ingested radionuclide absorbed by the blood from the small intestine. Selections were made for uranium-238 and uranium-234. Source: Eckerman et al. (1988).

^cWhen the reference source allowed a choice of lung clearance class, the factor corresponding to Class Y was selected. Class Y corresponds to a clearance half-time from the lung to the blood and gastrointestinal tract on the order of years, as opposed to days (Class D) or weeks (Class W). Selections were made for all but radium, for which the only choice was Class W. Source: Eckerman et al. (1988).

^dWLM = working level month; exposure to 1 working level (WL) of radon-222 or radon-220 decay products for 170 hours produces an exposure dose of 1 WLM. Source: International Commission on Radiological Protection (ICRP 1981).

Table 1-2
Status of the Maywood Site Properties

Property	Type of Property	Status ^a	Reference(s) ^b
Maywood Interim Storage Site, Maywood	Storage site	C	NUS Corp. (1983) BNI (1987a)
Sears property, Maywood	Commercial	C	BNI (1987c)
Ballod property, Rochelle Park	Commercial	C R - ^c	Cole et al. (1981) Crotwell (1985) BNI (1986b)
Stepan Company property, Maywood	Commercial	C	Morton (1982)
Scanel property, Maywood	Commercial	C	Kannard (1986a)
Hunter Douglas property, Maywood	Commercial	C	BNI (1987d)
Federal Express property, Maywood	Commercial	C	BNI (1987e)
Gulf station property, Maywood	Commercial	C	BNI (1989b)
DeSaussure property, Maywood	Commercial	C	BNI (1989c)
Sunoco station property, Maywood	Commercial	C	BNI (1987f)
New Jersey Vehicle Inspection Station, Lodi	State	C	BNI (1987g)
Bergen Cable property, Lodi	Commercial	C	Kannard (1987)
New Jersey Route 17, Maywood and Rochelle Park	State	C	Kannard (1986b)
New York, Susquehanna, and Western Railroad property (western right-of-way), Maywood	Commercial	C	Kannard (1986c)
454 Davison Avenue, Maywood	Residential	C R V	ORNL (1986a) BNI (1986c) ORNL (1986b)
459 Davison Avenue, Maywood	Residential	C R V	ORNL (1981a) BNI (1986c) ORNL (1986c)
460 Davison Avenue, Maywood	Residential	C R V	ORNL (1981b) BNI (1986c) ORNL (1986d)
464 Davison Avenue, Maywood	Residential	C R V	ORNL (1981c) BNI (1986c) ORNL (1986e)
468 Davison Avenue, Maywood	Residential	C R V	ORNL (1981d) BNI (1986c) ORNL (1986f)
459 Latham Street, Maywood	Residential	C R V	ORNL (1981e) BNI (1986c) ORNL (1986g)
461 Latham Street, Maywood	Residential	C	ORNL (1981f)

Table 1-2
(continued)

Property	Type of Property	Status ^a	Reference(s) ^b
		R	BNI (1986c)
		V	ORNL (1986h)
467 Latham Street, Maywood	Residential	C	ORNL (1981g)
		R	BNI (1986c)
		V	ORNL (1986i)
10 Grove Avenue, Rochelle Park	Residential	C	BNI (1984a)
		R	BNI (1986d)
		V	ORNL (1986j)
22 Grove Avenue, Rochelle Park	Residential	C	BNI (1984b)
		R	BNI (1986d)
		V	ORNL (1986k)
26 Grove Avenue, Rochelle Park	Residential	C	BNI (1984c)
		R	BNI (1986d)
		V	ORNL (1986l)
30 Grove Avenue, Rochelle Park	Residential	C	BNI (1984d)
		R	BNI (1986d)
		V	ORNL (1986m)
34 Grove Avenue, Rochelle Park	Residential	C	BNI (1984e)
		R	BNI (1986d)
		V	ORNL (1986n)
38 Grove Avenue, Rochelle Park	Residential	C	BNI (1984f)
		R	BNI (1986d)
		V	ORNL (1986o)
42 Grove Avenue, Rochelle Park	Residential	C	BNI (1984g)
		R	BNI (1986d)
		V	ORNL (1986p)
86 Park Way, Rochelle Park	Residential	C	BNI (1984h)
		R	BNI (1986d)
		V	ORNL (1986q)
90 Park Way, Rochelle Park	Residential	C	BNI (1984i)
		R	BNI (1986d)
		V	ORNL (1986r)
59 Avenue C, Lodi	Residential	C	ORNL (1984b)
		R	BNI (1986e)
		V	ORNL (1986s)
58 Trudy Drive, Lodi	Residential	C	ORNL (1984c)
		R	BNI (1986e)
		V	ORNL (1986t)
59 Trudy Drive, Lodi	Residential	C	ORNL (1984d)
		R	BNI (1986e)
		V	ORNL (1986u)
60 Trudy Drive, Lodi	Residential	D	ORNL (1989l)
		C	BNI (1989d)
61 Trudy Drive, Lodi	Residential	C	ORNL (1984e)
		R	BNI (1986e)
		V	ORNL (1986v)
62 Trudy Drive, Lodi	Residential	D	ORNL (1989a)
64 Trudy Drive, Lodi	Residential	C	BNI (1985a)
		R	BNI (1986e)

Table 1-2
(continued)

Property	Type of Property	Status ^a	Reference(s) ^b
		V	ORNL (1986w)
121 Avenue F, Lodi	Residential	C R V	BNI (1985b) BNI (1986e) ORNL (1986x)
123 Avenue F, Lodi	Residential	C R V	BNI (1985c) BNI (1986e) ORNL (1986y)
3 Hancock Street, Lodi	Residential	C R V	BNI (1985d) BNI (1986e) ORNL (1986z)
4 Hancock Street, Lodi	Residential	D C	ORNL (1989m) BNI (1989e)
5 Hancock Street, Lodi	Residential	D C	ORNL (1989n) BNI (1989f)
6 Hancock Street, Lodi	Residential	D C	ORNL (1989o) BNI (1989g)
7 Hancock Street, Lodi	Residential	D C	ORNL (1989p) BNI (1989h)
8 Hancock Street, Lodi	Residential	D C	ORNL (1989q) BNI (1989i)
9 Hancock Street, Lodi	Residential	C ^d	BNI (1989j)
10 Hancock Street, Lodi	Residential	D C	ORNL (1989r) BNI (1989k)
80 Hancock Street, Lodi	Commercial	D C	ORNL (1989s) BNI (1989l)
100 Hancock Street, Lodi	Commercial	D C	ORNL (1989t) BNI (1989m)
2 Branca Court, Lodi	Residential	D C	ORNL (1989u) BNI (1989n)
4 Branca Court, Lodi	Residential	D C	ORNL (1989v) BNI (1989o)
6 Branca Court, Lodi	Residential	D C	ORNL (1989w) BNI (1989p)
7 Branca Court, Lodi	Residential	D C	ORNL (1986za) BNI (1988a)
11 Branca Court, Lodi	Residential	D C	ORNL (1986zb) BNI (1988b)
14 Long Valley Road, Lodi	Residential	D C	ORNL (1989x) BNI (1989q)
16 Long Valley Road, Lodi	Residential	D C	ORNL (1986zc) BNI (1988c)
18 Long Valley Road, Lodi	Residential	D C	ORNL (1986zd) BNI (1988d)
20 Long Valley Road, Lodi	Residential	D C	ORNL (1986ze) BNI (1988e)

Table 1-2
(continued)

Property	Type of Property	Status ^a	Reference(s) ^b
22 Long Valley Road, Lodi	Residential	D C	ORNL (1986zf) BNI (1988f)
24 Long Valley Road, Lodi	Residential	D C	ORNL (1989y) BNI (1989r)
26 Long Valley Road, Lodi	Residential	D C	ORNL (1986zg) BNI (1988g)
11 Redstone Lane, Lodi	Residential	D C	ORNL (1986zh) BNI (1988h)
17 Redstone Lane, Lodi	Residential	D C	ORNL (1989z) BNI (1989s)
19 Redstone Lane, Lodi	Residential	C ^d	BNI (1989t)
Lodi Municipal Park, Lodi	Municipal	D C	ORNL 1986zi) BNI (1988i)
80 Industrial Road, Lodi	Commercial	D C	ORNL (1989za) BNI (1989u)
106 Columbia Lane, Lodi	Residential	D C	ORNL (1989zb) BNI (1989v)
99 Garibaldi Avenue, Lodi	Residential	D C	ORNL (1989zc) BNI (1989w)
Fire Station No. 2, Lodi	Municipal	D C	ORNL (1989zd) BNI (1989x)
Firemen's Memorial Park, Lodi	Municipal	D C	ORNL (1989zd) BNI (1989y)
72 Sidney Street, Lodi	Commercial	D C	ORNL (1988) BNI (1989z)
113 Essex Street, Maywood (National Community Bank)	Commercial	D	ORNL (1989ze)
160/174 Essex Street, Lodi (National Community Bank)	Commercial	D C	ORNL (1989zf, zg) BNI (1989za)
John F. Kennedy Municipal Park, Lodi	Municipal	D C	ORNL (1989zh) BNI (1989zb)
Interstate 80 (right-of-way), Lodi	Federal	D C	ORNL (1989c) BNI (1989zc)
90 Avenue C, Lodi	Residential	D ^e	ORNL (1989d)
108 Avenue E, Lodi	Residential	D	ORNL (1989e)
112 Avenue E, Lodi	Residential	D	ORNL (1989f)
113 Avenue E, Lodi	Residential	D	ORNL (1989g)
79 Avenue B, Lodi	Residential	D	ORNL (1989h)
136 W. Central Avenue, Maywood	Residential	D	ORNL (1989i)
200 Rt. 17, Maywood (Sears small truck repair)	Commercial	D	ORNL (1989j)
Rt. 17 and Essex Street, Maywood (Joseph Muscarelle	Commercial	D	ORNL (1989k)

Table 1-2
(continued)

Property	Type of Property	Status ^a	Reference(s) ^b
Associates)			

^aC = Radiological characterization completed on property.

R = Remedial action performed on property.

V = Verification performed on property by independent verification contractor.

D = Designation survey completed.

^bNUS Corp. = NUS Corporation; BNI = Bechtel National, Inc.;

ORNL = Oak Ridge National Laboratory.

^cOnly part of site remediated.

^dProperty not yet designated.

^ePartial remediation completed in 1991 as a time-critical removal action. Documentation of the cleanup being prepared.

Table 1-3
Concentrations of Metals in Soils at MISS

Metal	Concentration Range in Soil (ppm)	EP Toxicity ^a		Background Concentration (ppm)	
		Test Concen- tration (ppm)	EPA Limit (ppm)	Mean	Range
Antimony	<1 - 44	NA ^b	NA	NA	2 - 10
Arsenic	1.9 - 51	0.07	5	2	1 - 50
Barium 3,000	5 - 105	0.0171	100	500	100 -
Beryllium	<0.06 - 3	NA	NA	6	0.1 - 40
Cadmium	<0.4 - 20	<0.02	1	0.06	0.01 - 0.7
Chromium 3,000	5 - 3,920	<0.002	5	100	5 -
Copper	<1 - 167	NA	NA	20	2 - 100
Lead	<1 - 790	0.112	5	10	2 - 200
Mercury	<0.03 - 93	<0.001	0.2	0.03	0.01 - 3
Nickel 1,000	5 - <73	NA	NA	40	10 -
Selenium	<0.14 - 3	<0.003	1	--	0.01 - 2
Silver	<0.2 - <18	<0.02	5	0.1	0.01 - 5
Thallium	<5 - 744	NA	NA	0.1	NA
Zinc	16 - 304	NA	NA	50	10 - 300

^aThe extraction procedure (EP) toxicity test is an EPA-specified procedure formerly used to test the potential for RCRA-designated contaminants to be leached from waste materials.

^bNA = no data available.

Sources: Background concentrations, Braunstein (1981); other data, BNI (1987a).

2.0 STUDY AREA INVESTIGATIONS

One objective of the Maywood Site RI is to obtain site-specific information sufficient to develop and evaluate remedial action alternatives. To obtain this information, specific RI objectives for each operable unit were developed, and the data gaps existing after previous characterization activities were identified. The RI objectives for each operable unit are listed below.

Stepan property

- Determine the extent of surface radioactive contamination
- Determine horizontal and vertical boundaries of subsurface radioactive contamination
- Identify the chemical contaminants that resulted from thorium processing operations
- Determine whether RCRA-hazardous waste is mixed with radioactive waste
- Determine whether wastes buried at Stepan have migrated from those burial areas
- Confirm the validity of previous surveys' radiological measurements of fixed and removable contamination within buildings
- Confirm the validity of previous surveys' measurements of gamma exposure rates within buildings and over outdoor surfaces

MISS

- Determine whether waste in the storage pile contains RCRA-hazardous waste or PCBs
- Determine the average concentrations of radioactive waste in the pile
- Determine whether chemical contaminants are present in

onsite soil and identify the contaminants

- Determine whether chemical contaminants are migrating from MISS via surface water, sediment, or groundwater
- Quantify the radon and thoron exposure pathways at MISS
- Quantify residual radioactive contamination on structural surfaces in Building 76
- Resolve data gaps associated with the understanding of the MISS groundwater system

Residential vicinity properties

- Determine the extent of surface radioactive contamination on residential vicinity properties not previously characterized
- Determine the horizontal and vertical boundaries of subsurface radioactive contamination on these properties
- Investigate the potential presence of chemical contaminants associated with thorium processing operations
- Determine the mechanisms of contaminant transport
- Measure the gamma exposure rates on each property

Commercial/governmental vicinity properties

- Determine the extent of surface radioactive contamination on commercial/governmental properties investigated as part of this RI
- Determine horizontal and vertical boundaries of subsurface radioactive contamination on these properties
- Investigate the potential presence of chemical contaminants associated with thorium processing operations
- Determine the mechanisms of contaminant transport
- Measure the gamma exposure rates on each property

The following sections describe the activities performed to fill the data gaps identified for the Maywood Site. Activities

centered on collecting data and compiling information regarding surface features, contaminant sources, meteorology, surface water and sediments, hydrogeology, groundwater, demography, and ecology.

Table 2-1, adapted from Table 4-1 of the Field Sampling Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Maywood Site (BNI 1990c), provides a summary of the numbers of boreholes drilled and soil samples analyzed for radiological and chemical parameters at each operable unit. Tables 2-2 through 2-6 identify the types of analyses performed for each sampling interval in each chemical borehole. Table 2-7 supplements the summary in Table 2-1 by providing numbers of radiological boreholes drilled at each of the residential and commercial/governmental vicinity properties and the numbers of surface and subsurface samples analyzed for thorium-232, radium-226, and uranium-238.

2.1 SURFACE FEATURES INVESTIGATIONS

To identify potential historical waste production and storage areas and potential waste transport media, the initial investigation of the surface features of Stepan, MISS, and the vicinity properties concentrated on a chronological series of aerial photographs, topographic maps, owner drawings (where available), and eyewitness accounts. Before the RI field activities began, a civil survey of each property within the four operable units was prepared showing legal boundaries, buildings, and significant surface features, including major vegetation. The surveyor established the appropriate grid system, tying the coordinates to New Jersey State Plane coordinates so that the grid system could be reestablished for future activities.

Although the surface features of the properties had not changed between the time of the earlier characterization activities and the time of the RI, additional investigations were performed. This included a ground penetrating radar (GPR) survey of burial pits 1 and 2 at Stepan and portions of two commercial properties, 113 Essex Street (National Community Bank) and Route 17 and Essex

Street (Joseph Muscarelle and Associates), where the former channel of Lodi Brook is believed to have been located. Computer-enhanced analysis of aerial photographs was also performed to better define the original channel of Lodi Brook.

2.2 CONTAMINANT SOURCE INVESTIGATIONS

Contaminant sources at the Maywood Site have been identified based on historical records and the results of the previous radiological and limited chemical characterizations of the site. Section 2.0 of the Work Plan for the Remedial Investigation/ Feasibility Study-Environmental Impact Statement for the Maywood Site provides more detailed information about these previous studies (ANL 1990). The following sections summarize the activities performed to evaluate potential waste source(s) and to further characterize radiological, chemical, and physical characteristics of material within various media at the Maywood Site.

2.2.1 Radiological Investigations

The radiological investigations of the four operable units employed task-specific techniques to address the objectives outlined in the scoping and planning documents (ANL 1990; BNI 1990c, 1990d). Investigative methodologies included near-surface gamma radiation surveys, surface and subsurface soil sampling, downhole gamma logging, and gamma exposure rate measurements. Samples were analyzed for uranium-238, thorium-232, and radium-226.

A site-specific cleanup guideline for uranium will not be developed for the Maywood Site as stated in the work plan (ANL 1990). The results of this investigation, as well as previous site characterization efforts, have shown that uranium is not a predominant radioactive contaminant at the Maywood Site. Uranium has typically been detected at concentrations near background and is present with much higher concentrations of thorium. Because

there is a cleanup standard for thorium [which was adopted from 40 CFR 192 (Uranium Mill Tailings Remedial Action Program) and which is more restrictive than potentially derived guidelines for uranium] and since elevated areas of uranium are commingled with thorium above cleanup standards, a site-specific cleanup guideline is not necessary for uranium. Any actions taken to address the thorium contamination will also address the lower levels of uranium.

Five percent of the total number of soil samples analyzed for radiological parameters were also subjected to isotopic analysis of uranium, radium, and thorium to determine whether parent and daughter isotopes were in equilibrium. Results of isotopic analyses are presented in Table 4-2. In addition, where specified in the scoping and planning documents, smear samples were collected from building surfaces and analyzed to detect removable gross alpha and beta contamination. Hand-held alpha and beta-gamma detectors were used to measure levels of fixed radioactive contamination on these surfaces.

Data from a previously characterized and partially remediated vicinity property (Ballod) were reviewed to establish a more realistic correlation between counts per minute (cpm) (as determined in downhole gamma logging) and picocuries per gram (pCi/g) than had been used in previous characterizations at the Maywood Site. Previously, a correlation of 40,000 cpm to 15 pCi/g as an indicator of radioactive contamination was established through instrument calibration at TMC. However, this correlation is based on "ideal" conditions, including uniform distribution of contamination. Data for the Ballod property indicated that the average gamma log count rate was approximately 25,000 cpm at the bottom of the remediated layer of soil [i.e., thorium-232 concentrations were less than 15 pCi/g (the DOE guideline for cleanup)] and at the top of the clean layer of soil. Based on this information, downhole gamma logging results of 30,000 cpm were used as a conservative indicator of potential radioactive contamination and as a basis for selecting depths of contamination for sampling purposes and subsurface soil samples to be analyzed.

The following sections detail the specific radiological studies performed at each of the four operable units at the Maywood Site. Sampling results, along with figures showing measurement and sampling locations, are presented and discussed in Sections 4.4 through 4.7.

Stepan radiological investigations

To assess the extent of surface radioactive contamination, an initial near-surface walkover gamma survey was performed on the Stepan property using a 5- by 5-cm (2- by 2-in.) sodium iodide, thallium-activated [NaI(Tl) probe] unshielded gamma scintillation detector. The surveyor held the gamma detector several inches above the ground surface, slowly moved it back and forth along the traverse, and mapped the results.

Areas where measurements were found to be greater than twice the background count rate were resurveyed with a coneshielded gamma scintillation detector held 30.5 cm (12 in.) above the ground surface. The shielded detectors were calibrated at TMC to provide a correlation between counts per minute (cpm) and picocuries per gram (pCi/g). This calibration demonstrated that approximately 11,000 cpm on the coneshielded detector corresponds to the DOE guideline [5 pCi/g plus local average background (1 pCi/g)] for thorium-232 in surface soils (TMA/E 1989).

In addition to systematic soil sampling, biased soil sampling locations were selected based on results of the walkover and coneshielded surveys and reviews of historical surveys (Mata 1984; Cole et al. 1981; EG&G 1981; Coffman 1983; Morton 1981) to confirm the extent of surface contamination. Soil samples were collected and analyzed in accordance with the procedures outlined in the field sampling plan (BNI 1990c). The samples were analyzed for thorium-232, uranium-238, and radium-226 by gamma spectroscopy at Thermo Analytical/Eberline (TMA/E) laboratories in Albuquerque, New Mexico, and Oak Ridge, Tennessee.

To investigate the horizontal and vertical extent of subsurface

radioactive contamination, systematic and biased boreholes were drilled through all layers of previously disturbed soil and into at least 0.6 m (2 ft) of undisturbed soil. Such boreholes also were drilled in and adjacent to burial pits 1 and 2 on the Stepan property to determine whether contaminants have migrated from these burial areas. Boreholes could not be drilled into burial pit 3 because it is located beneath a warehouse supported by numerous wooden pilings; however, boreholes were drilled adjacent to it. Information concerning the existence of the wooden pilings beneath the warehouse was related by a Stepan employee, but no specific information as to their number or exact location was available when requested from Stepan Company records.

In each borehole, a shielded, sodium-iodide gamma scintillation detector was used to perform downhole gamma logging. TMC calibrated the instrument and determined that a count rate of approximately 30,000 cpm corresponds to the subsurface contamination guideline for thorium-232 (15 pCi/g above background). Downhole gamma radiation measurements were taken at 15-cm (6-in.) intervals to approximate the depths and concentrations of radioactive contamination and to assist in the selection of soil samples for laboratory analysis.

Continuous soil sampling was conducted in each borehole from a depth of 15 cm (6 in.) until undisturbed soil was penetrated at least 0.6 m (2 ft). A minimum of three samples from discrete intervals in each borehole were analyzed for thorium-232, radium-226, and uranium-238 to supplement the gamma logging results. Remaining samples were archived for future analyses.

To verify the presence of removable radioactive contamination within buildings, smear samples were collected from biased locations selected to confirm or negate findings of historical surveys. Areas of about 100 cm² (15.5 in.²) were wiped with smear paper, and the smears were counted for gross alpha and gross beta activity. If significant activity (exceeding DOE guidelines--see Appendix A) was detected, further analysis was performed to identify the isotopes present. Fixed contamination levels within the buildings were spot-checked with hand-held alpha and beta

detectors.

Where possible, surveying was conducted beneath painted, coated, wet, or dirty surfaces to ensure that radioactive contamination was not being masked by materials introduced to surfaces after thorium processing operations had ended. Analytical data for the samples and survey measurements were evaluated and compared with historical survey data (Morton 1982) to accurately define areas of fixed and/or removable contamination.

Indoor and outdoor gamma radiation exposure rates were measured to verify measurements from previous surveys and determine whether locations sampled were representative of the property. In each building where access was permitted, two to four measurements were taken at locations determined by the field sampling team. Indoor measurements were taken using either a pressurized ionization chamber (PIC) or a NaI(Tl) gamma scintillation detector designed to detect gamma radiation only. The PIC instrument has a response to gamma radiation that is proportional to exposure in roentgens. Time-integrated measurements at 1 m (3 ft) above the ground surface are made using both the PIC and the gamma scintillation detector to establish a correlation between microroentgens per hour ($\mu\text{R/h}$) and counts per minute (cpm). A factor for converting gamma scintillation measurements to gamma radiation exposure rates was established through the correlation of these two measurements at four locations during previous characterization activities at properties in the vicinity of the Stepan property. A total of 82 outdoor gamma radiation exposure rate measurements were made using an NaI(Tl) gamma scintillation detector.

Results of sampling activities at the Stepan property and figures showing sampling locations are presented in Section 4.4.

MISS radiological investigation

To determine the average concentrations of radioactive materials in the MISS storage pile, a soil sampling program was designed and agreed upon by DOE and NJDEP (Atkin 1989; Kaup 1989).

The pile was marked with a 15-m (50-ft) grid, and 37 boreholes

were drilled. To the degree possible, boreholes were drilled at the grid intersections, with adjustments made according to field conditions. Drilling depth at each location differed because of the variable height of the pile and the depth of the underlying leachate collection system.

To the degree possible, each borehole was sampled continuously from top to bottom. A randomly selected portion of the material extracted from each sampling interval was composited into one sample representative of the entire depth of the borehole. These samples were analyzed for thorium-232, uranium-238, and radium-226 by gamma spectroscopy at the TMA/E radiological analysis laboratories. Immediately after each borehole was drilled, the penetrated area of the pile cover was repaired.

The presence of radon and thoron at MISS at concentrations exceeding background has been documented by the environmental monitoring program (BNI 1989a). Clean soil has been placed as shielding at locations where measurements exceeded background, and this has resulted in annual average concentrations below the DOE DCG of 3.0 pCi/L (BNI 1991a). In addition to environmental monitoring measurements, rates of radon emanation (flux) from the site surface and storage pile have been determined as required for compliance with radionuclide provisions of the Clean Air Act and to support the remedial investigation. Thoron flux rates for the pile also were determined for informational purposes.

Flux rates were measured by placing charcoal canisters on the ground for a 24-h period. The canisters were then collected, and the amounts of radon and thoron were determined by gamma spectroscopy. The emanation rate was calculated based on the concentrations, surface area of the canisters, and the collecting times.

Sampling activities at MISS, along with figures showing sampling locations for the interim storage pile and for onsite soils, are discussed in Section 4.5.

Radiological investigations at residential vicinity properties

Eight residential vicinity properties required radiological investigation, including 70 West Hunter Avenue in Maywood, which was characterized to determine whether contamination extended onto it from the adjacent Stepan property.

The remaining seven properties had been designated for inclusion in FUSRAP but required more comprehensive investigation.

These properties (see Figure 1-4) include:

- 79 Avenue B, Lodi
- 90 Avenue C, Lodi
- 108 Avenue E, Lodi
- 112 Avenue E, Lodi
- 113 Avenue E, Lodi
- 62 Trudy Drive, Lodi
- 136 West Central Avenue, Maywood

On each residential vicinity property, an initial near-surface walkover gamma survey was performed to identify areas of elevated radionuclide activity. At all locations where walkover survey measurements were greater than twice the background level, near-surface gamma measurements were also taken using a coneshielded gamma scintillation detector. [The average background level for the Maywood area is 7,500 cpm (Bradshaw 1990).]

To identify surface areas where concentrations exceeded the DOE guideline of 5 pCi/g for thorium-232, areas with measurements of more than 11,000 cpm were mapped. These data were used to determine the locations for biased surface soil sampling. [Biased soil samples were collected at locations where gamma radiation measurements were detected at levels twice background or greater (i.e., 15,000 cpm or higher, using a shielded detector).] These biased samples and samples collected systematically at 7.5-m (25-ft) intervals were then used to estimate the areal extent of surface contamination. These samples were analyzed for thorium-232, radium-226, and uranium-238 by gamma spectroscopy.

On each residential vicinity property, a subsurface

investigation also was conducted to evaluate the horizontal and vertical extent of subsurface radioactive contamination and to investigate whether subsurface contamination might exist even where there was no surface contamination. This investigation consisted of drilling systematic and biased boreholes using either a 7.5-cm or 15-cm (3-in. or 6-in.) auger bit. Biased borehole locations were selected based on the walkover survey and coneshielded measurements. All boreholes were drilled through disturbed soils and at least 0.6 m (2 ft) into undisturbed soil. Sampling frequency and radiological analyses for residential vicinity properties are summarized in Tables 2-1 and 2-7.

Downhole gamma logging was performed in all boreholes at 15-cm (6-in.) intervals to determine the depths and concentrations of contamination and to assist in selecting soil samples to be analyzed by the laboratory. In addition to downhole gamma logging, continuous soil sampling was conducted beginning at a depth of 15 cm (6 in.) and continuing at 30.5-cm (1-ft) intervals until the bottom of the borehole was reached. Based on downhole gamma log data, a minimum of three samples from discrete intervals in each borehole was analyzed by gamma spectroscopy for thorium-232, radium-226, and uranium-238 to further define contamination boundaries. Remaining samples were archived for future analysis.

To identify the mechanism(s) of contaminant transport to residential properties, biased boreholes were drilled in areas where the former channel of Lodi Brook is believed to have existed.

Soil samples were collected from these boreholes and analyzed by gamma spectroscopy for thorium-232, radium-226, and uranium-238.

To determine interior and exterior gamma radiation exposure rates for residential occupants, measurements were taken at each property, where determined necessary, using the same methodology and instrumentation as for the Stepan property.

Section 4.6 details the RI activities performed at each residential vicinity property and includes figures showing sampling locations.

Radiological investigations at commercial/governmental vicinity properties

Five commercial/governmental vicinity properties required complete radiological characterization as part of this RI. Four had been previously designated for inclusion in FUSRAP based on data from designation surveys performed by ORNL. These properties were:

- 200 State Route 17 (Sears Repair Center), Maywood
- Essex Street and Route 17 (Muscarelle and Associates), Maywood
- 113 Essex Street (National Community Bank), Maywood
- Interstate 80 (westbound right-of-way), Lodi

The property at 205 Maywood Avenue in Maywood (Myron Manufacturing) was characterized to determine whether contamination had extended onto it from the adjacent Stepan property.

The technical methodology for RI activities at commercial/governmental vicinity properties was similar to that used at the residential vicinity properties. Minor modifications included the application of a larger survey grid and an increase in the number of boreholes drilled and sampled (to better define the vertical and horizontal boundaries of contamination). Sampling frequency and radiological analyses for commercial/governmental vicinity properties are summarized in Tables 2-1 and 2-7. Investigation results and figures showing sampling locations are presented in Section 4.7.

2.2.2 Chemical Investigations

Data from previous investigations were reviewed prior to chemical investigation activities. The chief objectives of the chemical investigations on the various properties were to determine whether waste would be characterized as RCRA-hazardous upon removal and whether chemical contamination existed that met the FFA definition of FUSRAP waste (see Section 1.2). Additional analysis was performed for VOCs, BNAEs, and pesticides/PCBs if the total petroleum hydrocarbon (TPH) concentration exceeded 1,000 ppm, in accordance with analytical parameters specified by NJDEP (Atkin 1989; Kaup 1989). Five percent of the planned number of boreholes on vicinity properties were selected for chemical sampling; the numbers of samples analyzed and the corresponding analytical parameters are shown in Tables 2-1 through 2-6. These samples were selected based on their locations and what they could reveal regarding potential transport pathways through the various media. All of the boreholes sampled on MISS were sampled for analysis of chemical parameters.

The chemical investigation activities for each operable unit are described in the following subsections.

Stepan chemical investigation

Chemical characterization of the Stepan property was conducted to (1) determine the presence of chemical contaminants that could have resulted from thorium processing, (2) determine whether RCRA-hazardous waste is mixed with radioactive waste, and (3) determine whether contaminants have migrated from waste burial pits.

To determine the presence of potential chemical contaminants, samples were collected from 10 boreholes selected by the field sampling team after radioactively contaminated areas were identified. Samples were taken from discrete intervals above, within, and below radioactively contaminated zones. Each selected borehole was sampled at depth intervals of approximately 0.6 m

(2 ft). The 10 boreholes sampled included five that exhibited subsurface radioactive contamination, three that exhibited surface contamination only, and two that were not radioactively contaminated.

The samples were analyzed for constituents that may have been present in the original ores used at MCW or that are believed to have been introduced during the manufacturing process. Soil samples from all chemical boreholes were analyzed for metals, rare earth elements, and mobile ions (i.e., phosphate, chloride, nitrate, and sulfate). This strategy for chemical sampling and analysis was chosen so that DOE could determine whether waste that met the definition of FUSRAP responsibility existed on the Stepan property. Data collected during the Stepan RI/FS will be used by DOE to supplement this RI and better define waste characteristics and DOE responsibility.

To determine the presence of constituents that might be classified as RCRA-hazardous waste (according to 40 CFR 261), 36 to 40 samples [5 percent of the total number of soil samples (778) collected for radiological analysis] were analyzed for TCLP metals, corrosivity, and sulfide and cyanide reactivity. Ignitability was not tested because no solvents or organics were used in the thorium processing and this characteristic is not suspected in the waste. Analysis also was performed for total PCBs (21 samples) and TPH (31 samples). Samples in which TPH exceeded 1,000 ppm were screened for EPA priority pollutants (VOCs, BNAEs, and pesticides/PCBs) in accordance with analysis parameters specified by NJDEP (Atkin 1989; Kaup 1989).

To determine whether contaminants from wastes in burial pits 1, 2, and 3 have migrated, boreholes were drilled around the perimeter of each pit at intervals of 7.5 to 15 m (25 to 50 ft). Locations of these boreholes were adjusted as needed depending on the accessibility and size of the burial areas. Boreholes were drilled within accessible burial areas to a minimum of 0.6 m (2 ft) into undisturbed soil. Discrete sampling was conducted in each borehole; soil samples were collected at 0.3-m (1-ft) increments and were analyzed for TCLP metals, corrosivity, reactivity, PCBs,

and TPH. Sampling frequency and analyses for the Stepan property are summarized in Tables 2-1 and 2-2.

Results of the chemical investigation at the Stepan property and figures showing sampling locations are presented in Section 4.4. Data quality objectives associated with the analytical results from this sampling are discussed in Appendix I.

MISS storage pile chemical investigation

The chemical investigation of the MISS storage pile was undertaken to determine whether the pile contains RCRA-hazardous waste or PCBs. Soil samples from the storage pile were collected and analyzed according to a specific sampling and analysis program agreed upon by DOE and NJDEP. The program was designed to ensure that adequate data were collected to enable this classification (Atkin 1989; Kaup 1989).

A systematic approach was undertaken to ensure the collection of representative samples. The pile was marked with a 15-m (50-ft) grid, and boreholes were drilled, to the degree possible, near the intersection of the grid lines. Drilling locations were adjusted when necessary to ensure drill rig stability or to avoid obstructions in the pile. Considering that the pile occupies approximately 0.8 ha (2 acres), sampling on the 15-m (50-ft) grid required the drilling of 37 boreholes.

Borehole depths varied with the height of the pile, which averages 5.5 m (18 ft), and the depth of the underlying leachate collection system. Caution was exercised to avoid puncturing the impermeable liner beneath the pile. Drilling depths were selected to sample as much material in the pile as possible and yet allow an adequate safety margin to protect the bottom liner; side slopes were also considered.

Samples collected from the boreholes were composited into representative samples over 0.9-m (3-ft) intervals. Boreholes were drilled from the top of the pile, and up to six samples per borehole were collected. All samples were analyzed for TCLP metals, total PCBs, sulfide and cyanide reactivity, and TPH.

Samples in which TPH exceeded 1,000 ppm were analyzed for EPA priority pollutants (VOCs, BNAEs, and pesticides/PCBs). For VOC analysis, septum-sealed vials were filled with material from each discrete interval before the composite sample was obtained. Based on TPH results (when TPH concentrations were greater than 1,000 ppm), the VOC vials were submitted to the laboratory for analysis. In addition to these analyses, 10 percent of the samples (16 of 167 samples) were analyzed for TCLP organics and corrosivity. Samples were selected using a random sequence to select the borehole and the depth. Sampling frequency and analyses for the storage pile at MISS are summarized in Tables 2-1 and 2-4.

Results of the chemical investigation at the MISS storage pile and figures showing sampling locations are presented in Section 4.5. Data quality objectives are discussed in Appendix I.

MISS onsite chemical investigation

RI goals for the onsite portion of MISS (i.e., areas other than the storage pile) included determining whether chemical contaminants were present in onsite soil and identifying those contaminants. A plan to chemically characterize onsite overburden material was developed after existing data (BNI 1986a; BNI 1987a,b; BNI 1988j; Ebasco 1987; Ebasco 1988) were reviewed. A limited chemical characterization performed by BNI in 1986 revealed the presence of VOCs and semivolatiles in MISS soil. To augment these results, 34 boreholes were drilled; each was advanced approximately 0.6 m (2 ft) beyond the depth of radioactive contamination. If bedrock was encountered before this depth was reached, drilling operations ceased.

Composite samples were collected over the radioactively contaminated intervals. To provide detailed information on chemicals present in the radioactive waste, samples were also collected at discrete intervals from 17 (50 percent) of the boreholes and were analyzed for Target Compound List (TCL) and Target Analyte List (TAL) constituents (Tables 2-8 and 2-9). This information was obtained primarily for risk assessment and worker

health protection. Selection of boreholes and sampling depths was determined using a random number generator. Soil samples were collected from the center of each discrete interval and placed in septum-sealed vials for VOC analysis (which was performed if TPH exceeded 1,000 ppm). After the discrete sample was collected, the remaining soil for the entire depth of the borehole was composited and analyzed for TPH, total PCBs, mobile ions, and RCRA characteristics (including sulfide and cyanide reactivity and corrosivity). Ignitability was not tested because no solvents or other organics are known to have been used in thorium processing operations, and the waste is not believed to be ignitable. A discrete sample collected from a depth below the zone of radioactive contamination in each borehole was analyzed for TCL and TAL constituents to determine whether chemical contamination is present outside the known boundaries of radioactive contamination.

Sampling frequency and analyses for MISS onsite locations are summarized in Tables 2-1 and 2-3.

Results of the MISS onsite chemical investigation and figures showing sampling locations are presented in Section 4.5.

Chemical investigation of residential vicinity properties

The objective of the chemical characterization of the residential properties was to determine whether chemical contaminants associated with thorium processing operations were present on the properties, whether chemical contaminants have migrated from MISS, and whether chemical contaminants are mixed with radioactive constituents. Biased boreholes were sampled at specified intervals above, within, and below the radioactive contamination, and samples were submitted for chemical analysis. Approximately three 0.6-m (2-ft) intervals per borehole were sampled, and the samples were analyzed for metals, rare earth elements (lanthanides), TCLP metals, reactivity, corrosivity, TPH, and total PCBs (Tables 2-1 and 2-5). Results of the chemical investigation of the residential vicinity properties are presented in Section 4.6.

Chemical investigation of commercial/governmental vicinity properties

The chemical characterization of the commercial/governmental vicinity properties was conducted to investigate the potential presence of chemical contaminants associated with thorium processing, to determine whether chemical contaminants are mixed with radioactive constituents, and to determine whether chemical contaminants have migrated from MISS. Sampling and analysis were conducted as shown in Tables 2-1 and 2-6. Results are presented in Section 4.7.

2.3 METEOROLOGICAL INVESTIGATIONS

No new meteorological investigations were conducted as part of this RI, but meteorological information was gathered during previous characterization and removal action activities and through DOE's routine environmental monitoring program at MISS. Meteorological conditions at the Maywood Site are described in Section 3.2.

2.4 SURFACE WATER/SEDIMENT INVESTIGATION

The objectives of the surface water/sediment investigation were to determine whether radioactive or chemical contaminants originating at MISS are migrating into (and being transported offsite by) the current surface water flow system and to determine any impact of waters from MISS on the surface waters in the vicinity. The investigation included collection of surface water and sediment samples from locations upstream and downstream of MISS (Figure 2-1 shows sampling locations). The samples were analyzed to determine the presence or absence of radionuclides and chemical constituents, quantify constituent concentrations, and evaluate the mode of constituent transport (i.e., particulate or solution).

Surface water and sediment are transported from MISS via Westerly Brook and a drainage ditch that discharges into Lodi

Brook. As shown in Figure 2-1, Westerly Brook enters MISS from the north and flows through an underground culvert beneath the northwest portion of the site. Surface water from MISS is channeled along the railroad spurs and enters the Westerly Brook culvert through a drop manhole just before it exits the site.

As stated in the field sampling plan, collection of surface water and sediment samples was planned. However, there was insufficient surface water runoff to obtain these samples; therefore, the only data included for the RI report are data that were collected during the routine environmental monitoring of MISS.

Surface water and sediment samples have been collected quarterly from locations 1 through 4 since 1986 as part of the ongoing DOE environmental monitoring program. Sampling location 1 is immediately upstream of the confluence of Westerly Brook and the Saddle River. Sampling location 2 is along Westerly Brook where it flows out of a culvert approximately 190 m (600 ft) upstream from the Saddle River. Sampling location 3 is further upstream along Westerly Brook north and upstream of the site. Sampling location 4 is south of I-80 on Lodi Brook approximately 460 m (1,500 ft) downstream of MISS.

Samples collected as part of the environmental monitoring program were analyzed for total uranium, radium-226, thorium-232, and indicator parameters (TOC, TOX, pH, specific conductance). During the fourth quarter of 1990 and the first, second, and third quarters of 1991, environmental monitoring program samples were collected as part of the RI. These samples were analyzed for metals, lithium, rare earth elements, and mobile ions, in addition to the regular suite of analyses described above. The surface water samples were analyzed for both total and dissolved radionuclides, metals, and rare earth elements. In addition, the surface water samples collected during the third quarter of 1990 were analyzed for volatile and semivolatile organic compounds.

The description of the local surface water system is presented in Section 3.3. Results of the surface water/sediment investigation are discussed in Sections 4.4 through 4.7.

2.5 HYDROGEOLOGIC INVESTIGATION

The objective of the hydrogeologic investigation conducted during the RI was to provide additional hydrogeologic data to supplement the subsurface data collected during previous investigations. The investigation focused on the resolution of data gaps associated with the understanding of the MISS groundwater system. Historically, water level data from the DOE environmental monitoring program have shown an anomalous groundwater flow pattern in the vicinity of MISS wells 5A, 6A, and 7A (see Section 2.6). Periodically, the water level in one or more of the wells is 0.3 to 0.9 m (1 to 3 ft) lower than levels in adjacent wells, creating an apparent groundwater sink. The RI explored two possible explanations: groundwater interaction with (and flow along) a relict buried stream channel and groundwater flow into the underground conduit.

To perform the investigation, 12 boreholes were drilled. Field permeability testing was performed and two of the boreholes were completed as monitoring wells. The interior of the Westerly Brook underground conduit was visually inspected. Borehole and well locations are shown in Figure 2-2.

Ten of the 12 boreholes (G19 through G28) were drilled to identify the suspected channel. At each location, unconsolidated materials were collected continuously using split-spoon samplers, and 1.5 to 3 m (5 to 10 ft) of bedrock was cored using an NX-size (nominal 2-in. I.D.) core bit and barrel. Total borehole depths ranged from 6 to 9.5 m (20 to 30 ft). In six of the boreholes, falling head permeability tests were conducted to provide estimates of hydraulic conductivities of the unconsolidated sediments unit. None of the 10 test boreholes were completed as monitoring wells; all were backfilled with a bentonite/cement grout.

Two of the boreholes drilled (B38W19D and B38W19S) were completed as paired wells to monitor the unconsolidated sediments unit and the bedrock zone. Overburden material in the boreholes was collected continuously using split-spoon samplers through hollow-stem augers. The upper portion of the deep well was sealed

off by steel casing and grouted. The lower portion of the hole was cored using an NX core bit and then reamed. Descriptions of core samples were recorded, and the samples were stored in core boxes. Cores and soil samples were labeled and placed in storage facilities at MISS.

The boreholes were completed with 5-cm (2-in.) Type 316 stainless steel flush-threaded casing and 0.025-cm (0.01-in.) continuous slotted stainless steel wire-wrapped screen. The annular space around the casing was filled with graded silica sand to a height of approximately 0.3 m (1 ft) above the screened interval. Bentonite seals approximately 0.6 m (2 ft) thick were placed above the silica sand, and the remaining annular space was grouted to the surface with a cement and bentonite grout mixture.

The hydrogeologic conditions in the Maywood and Lodi areas are described in Section 3.5. Results of chemical analysis and a discussion of contaminants identified are presented in Sections 4.4 through 4.7.

2.6 GROUNDWATER SAMPLING AND ANALYSIS

Sampling and analysis of groundwater were conducted to investigate the nature, extent, and concentrations of contaminants present in the groundwater and the potential for contaminant migration from MISS. The groundwater sampling program utilized the existing well network established for the DOE environmental monitoring program and wells completed during the RI to supplement the network. The environmental monitoring program includes 31 wells: 15 installed in 1984 (first phase) and 16 installed between August 1987 and November 1988 (second phase). In addition, two wells (B38W19S and B38W19D) were installed to meet the objectives of the hydrogeologic investigation performed as part of the MISS RI.

The wells installed in 1984 include shallow wells, completed with polyvinyl chloride (PVC) casing and screen, and bedrock wells, completed open hole in bedrock with the upper portion of the hole sealed with steel casing. The wells installed in 1987 and 1988 and

the RI wells were completed with stainless steel casing and screen.

The DOE environmental monitoring program wells were installed to monitor the shallow groundwater system at MISS and the immediate vicinity. Monitoring well construction details are summarized in Table 2-10; well locations are shown in Figure 2-3. The wells include 10 well pairs, one cluster of 3 wells, and 8 single wells.

Each well pair consists of a shallow well, which is completed in the unconsolidated materials to monitor the zone of fluctuation of the water table, and a deeper well, which is completed in competent bedrock within the zone of saturation. Seven of the single wells are completed in bedrock; one is completed in a relict channel. Well site MISS-5 has three wells, including one (MISS-5A-1) that has been dry since installation. Another well (MISS-1A) is dry most of the time; between December 1990 and May 1991, the water table intersected it only periodically.

Groundwater samples from selected wells have been collected quarterly since 1985 as part of the ongoing DOE environmental monitoring program. These samples are routinely analyzed for total uranium, radium-226, thorium-232, metals, and indicator parameters (TOC, TOX, pH, specific conductance). During the fourth quarter of 1990 and the first, second, and third quarters of 1991, environmental monitoring program samples were collected for use during the RI. These samples were analyzed for total and dissolved uranium, radium-226, and thorium-232, total and dissolved metals, total and dissolved rare earths, mobile ions, and indicator parameters. In addition, selected samples were analyzed for radium-228, thorium-228, and thorium-230, and samples collected during the third quarter of 1990 were analyzed for volatile and semivolatile organic compounds.

Results of groundwater sampling and analysis are discussed in Section 4.8.

2.7 DEMOGRAPHY AND LAND USE INVESTIGATIONS

Information on human populations is provided in Section 3.6 of this report. This information is based on data gathered during

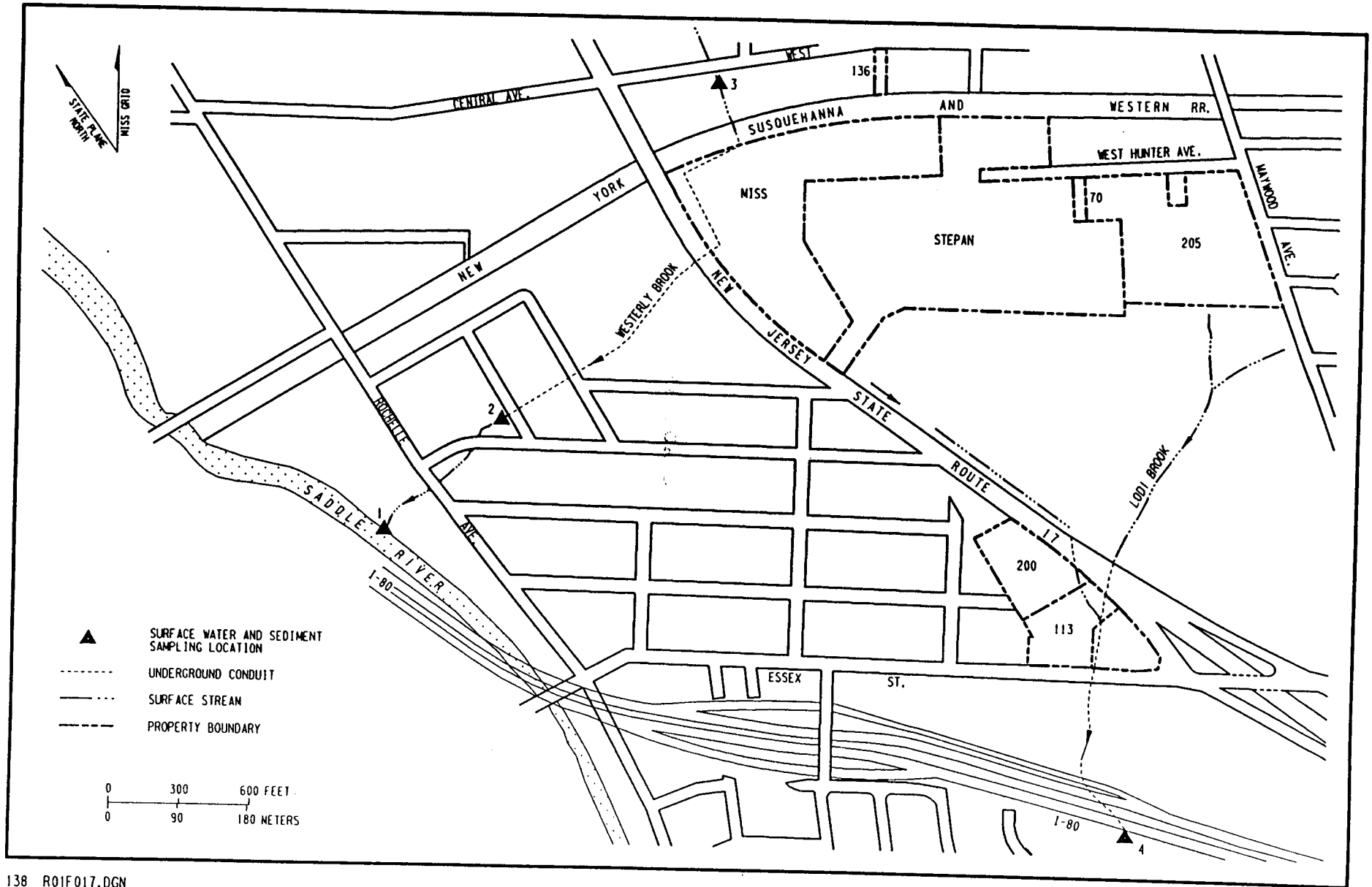
previous characterization and removal action activities at the Maywood Site.

2.8 ECOLOGICAL INVESTIGATIONS

The ecological investigations of the Maywood Site consist of reviews of existing documents on regional ecology and performance of an onsite survey in August 1992. The onsite survey focused on documentation of both terrestrial and aquatic habitats for wildlife and water fowl. The survey also showed a number of commonly encountered species that serve as potential receptor populations. Information gathered from these investigations is presented in Section 3.7. Additional information regarding ecological conditions for the Maywood Site is being collected as part of the Stepan RI/FS being conducted by CH2M Hill. That information will be available for evaluation and inclusion in the baseline risk assessment.

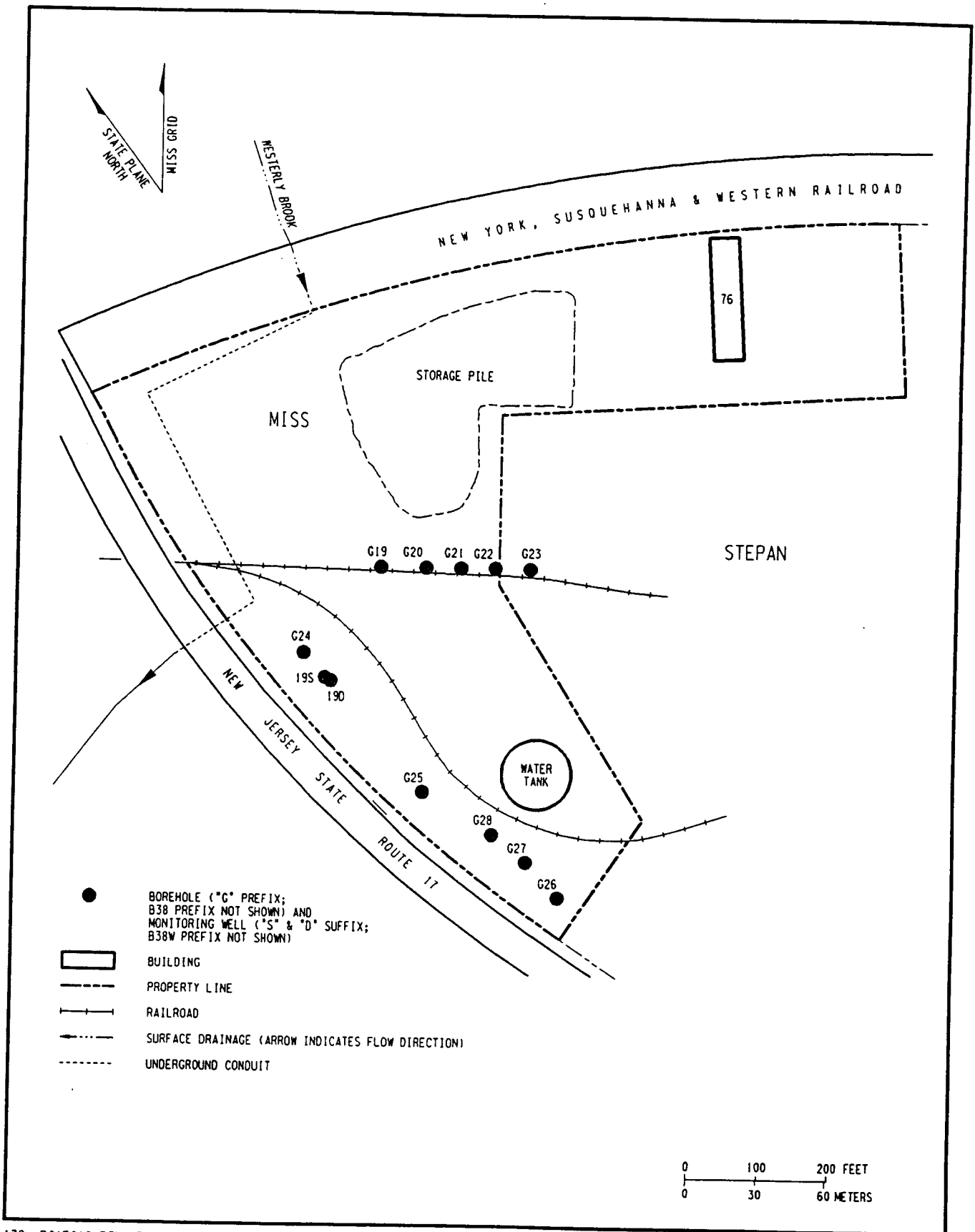
FIGURES FOR SECTION 2.0

2-25



138 ROIF017.DGN

Figure 2-1
Offsite Surface Water and Sediment Sampling Locations for MISS



138 R01F018.DGN F1

Figure 2-2
1989 Geologic Borehole and Monitoring Well Locations at MISS

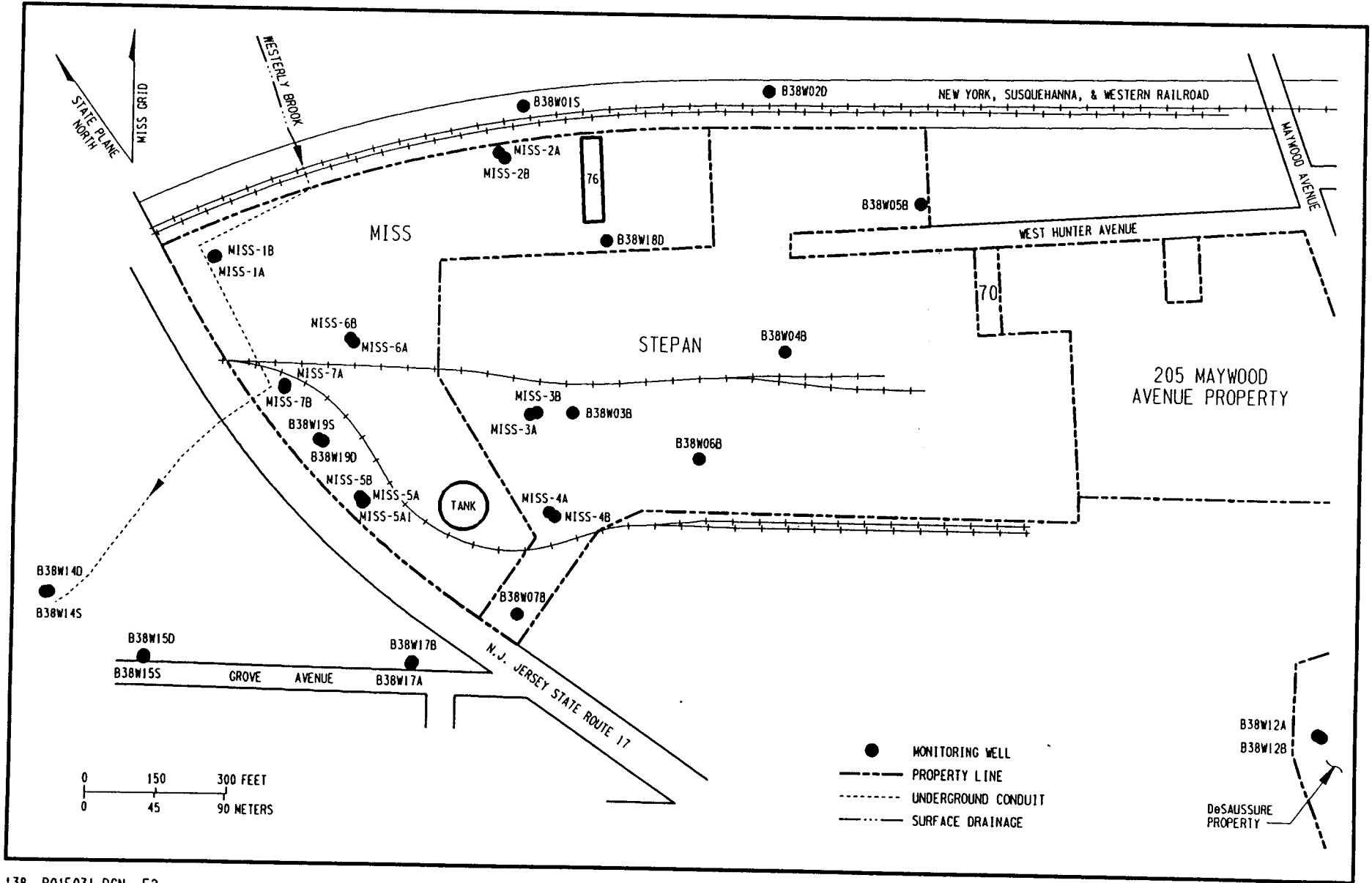


Figure 2-3
Monitoring Wells at MISS and Vicinity

TABLES FOR SECTION 2.0

Table 2-1

Sampling Frequency and Analyses for Soil at Each Operable Unit

Page 1 of 3

Operable Unit	RI Objective/Activity	Analytical Parameters ^a	Number of Locations Sampled	Number of Samples Analyzed	Data Quality Level ^b
Stepan Property	<ul style="list-style-type: none"> Determine extent of surface radioactive contamination <ul style="list-style-type: none"> Walkover surveys Analysis of surface soil samples 	Gamma count rate	Not applicable	Not applicable	II
		Th-232, Ra-226, U-238	238	238	III
	<ul style="list-style-type: none"> Determine horizontal and vertical boundaries of subsurface radioactive contamination <ul style="list-style-type: none"> Analysis of subsurface soil samples Downhole gamma logging 	Th-232, Ra-226, U-238	237	766	III
		Downhole gamma count rate	237	Not applicable	
		<u>Chemical Parameters</u> Metals and Rare Earths	(10) ^c	(42) ^d	III
	<ul style="list-style-type: none"> Identify chemical contaminants resulting from thorium processing operations <ul style="list-style-type: none"> Determine whether Th-232 chemical process contaminants are present within areas of radioactive contamination Determine whether RCRA-hazardous waste is mixed with radioactive waste Determine whether wastes have migrated from burial areas 	VOCs	5	12	III
		BNAEs	5	11	III
		PCBs	5	21	III
		Pesticides/PCBs	4	10	III
		TPH	8	31	III
		TCLP Metals	9	36	III
		TCLP VOCs	9	36	III
		TCLP BNAEs	9	36	III
		TCLP Pesticides	7	27	III
		TCLP Herbicides	7	28	III
	Corrosivity	10	40	III	
	Reactivity	9	36	III	
Mobile Ions	10	40	III		

MISS

Storage Pile:

• Determine average concentrations of radioactive waste in storage pile	Th-232, Ra-226, U-238	30	30 ^e	III
• Determine whether storage pile contains RCRA-hazardous waste or PCBs	<u>Chemical Parameters</u>	(37) ^c	(167) ^d	
	VOCs	18	28	III
	BNAEs	18	29	III
	PCBs	37	122	III
	Pesticides/PCBs	17	28	III
	TPH	37	150	III
	TCLP Metals	37	149	III
	TCLP VOCs	16	19	III
	TCLP BNAEs	16	20	III
	TCLP Pesticides	16	20	III
	TCLP Herbicides	4	5	III
	Corrosivity	16	20	III
	Reactivity	37	152	III

Table 2-1
(continued)

Operable Unit	RI Objective/Activity	Analytical Parameters ^a	Number of Locations Sampled	Number of Samples Analyzed	Data Quality Level ^b
MISS (cont'd)	<u>Other Onsite Locations:</u>				
	<ul style="list-style-type: none"> • Determine whether chemical contaminants are present in onsite soil and identify contaminants <ul style="list-style-type: none"> - Determine whether Th-232 chemical process contaminants are present in areas of radioactive contamination - Determine whether RCRA-hazardous waste is mixed with radioactive waste - Collect/analyze discrete samples from beneath areas of known radioactive contamination - Downhole gamma logging 	<u>Chemical Parameters</u>	(34) ^c	(148) ^d	
		Metals and Rare Earths	34	70	III
		VOCs	33	73	III
		BNAEs	33	68	III
		PCBs	31	38	III
		Pesticides/PCBs	33	68	III
		TPH	32	45	III
		TCLP Metals	30	76	III
		TCLP VOCs	31	72	III
		TCLP BNAEs	30	76	III
		TCLP Pesticides	30	76	III
		TCLP Herbicides	30	76	III
		Corrosivity	32	71	III
Reactivity	32	73	III		
Mobile Ions	31	37	III		
	Downhole gamma count rate	46	Not Applicable		
Residential Vicinity Properties (8)	<ul style="list-style-type: none"> • Determine extent of surface radioactive contamination <ul style="list-style-type: none"> - Walkover surveys - Analysis of surface soil samples 	Gamma count rate	Not Applicable	Not Applicable	II
		Th-232, Ra-226, U-238	120	120	III
	<ul style="list-style-type: none"> • Determine horizontal and vertical boundaries of subsurface radioactive contamination <ul style="list-style-type: none"> - Analysis of subsurface soil samples - Downhole gamma logging 	Th-232, Ra-226, U-238	130	421	III
		Downhole gamma count rate	124	Not Applicable	III
		<ul style="list-style-type: none"> • Investigate potential presence of chemical contaminants resulting from thorium processing operations <ul style="list-style-type: none"> - Determine whether Th-232 chemical process contaminants are present in areas of radioactive contamination - Determine whether RCRA-hazardous waste is mixed with radioactive waste 	<u>Chemical Parameters</u>	(4) ^c	(12) ^d
	Metals and Rare Earths		4	12	III
	PCBs		4	12	III
	TPH		4	12	III
TCLP Metals	4	12	III		
Corrosivity	2	7	III		
Reactivity	4	12	III		

Table 2-1
(continued)

Operable Unit	RI Objective/Activity	Analytical Parameters ^a	Number of Locations Sampled	Number of Samples Analyzed	Data Quality Level ^b
Commercial/ Governmental Vicinity Properties (5)	<ul style="list-style-type: none"> Determine extent of surface radioactive contamination <ul style="list-style-type: none"> Walkover surveys Analysis of surface soil samples 	Gamma count rate	Not Applicable	Not Applicable	II
		Th-232, Ra-226, U-238	88	88	III
	<ul style="list-style-type: none"> Determine horizontal and vertical boundaries of subsurface radioactive contamination <ul style="list-style-type: none"> Analysis of subsurface soil samples Downhole gamma logging 	Th-232, Ra-226, U-238	167	546	III
		Downhole gamma count rate	169	Not Applicable	
		<u>Chemical Parameters</u>	(5) ^c	(19) ^d	
	<ul style="list-style-type: none"> Investigate potential presence of chemical contaminants resulting from thorium processing operations <ul style="list-style-type: none"> Determine whether Th-232 chemical process contaminants are present in areas of radioactive contamination Determine whether RCRA-hazardous waste is mixed with radioactive waste 	Metals and Rare Earths	5	19	III
		VOCs	3	3	III
		BNAEs	3	3	III
		PCBs	5	16	III
		Pesticides/PCBs	3	3	III
		TPH	5	19	III
		TCLP Metals	5	19	III
		TCLP VOCs	1	3	III
		TCLP BNAEs	1	3	III
TCLP Pesticides		1	3	III	
Corrosivity	5	19	III		
Reactivity	5	18	III		
Mobile Ions	5	19	III		

^aVOCs - volatile organic compounds; BNAEs - base/neutral and acid extractable organic compounds; PCBs - polychlorinated biphenyls; TPH - total petroleum hydrocarbons; TCLP - toxicity characteristic leaching procedure.

^bEPA 1987.

^cTotal number of chemical boreholes drilled/sampled.

^dTotal number of samples collected from chemical boreholes for analysis of chemical parameters.

^eComposite samples.

Table 2-2
(continued)

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	TCLP Pest.	TCLP Herb.	Corr.	React.	Mobile Ions
138-STC-065	B3890C701	0-2	•	•	•		•		•	•	•	•	•	•	•	•
138-STC-066	B3890C701	2-4	•	•	•		•		•	•	•	•	•	•	•	•
138-STC-067	B3890C701	4-6		•												
138-STC-068	B3890C701	6-8	•	•	•		•		•	•	•	•	•	•	•	•
138-STC-069	B3890C701	8-10	•	•	•		•		•	•	•	•	•	•	•	•
Total (42)	(10)		39	12	11	21	10	31	36	36	36	27	28	40	36	40

138-MS-073
138-MS-074

B3890C007
B3890C007

0-2
14-16

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Table 2-3
(continued)

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	TCLP Pest.	TCLP Herb.	Corr.	React.	Mobile Ions
138-MS-C-075	B3890C024	4-6							.	.	.	.	.
138-MS-C-076	B3890C024	0-8				.		.						.	.	.
138-MS-C-077	B3890C024	6-8	.	.	.		.				
138-MS-C-078	B3890C024	10-12	.			.		.	.		.	.	.
138-MS-C-079	B3890C005	0-2	.	.	.		.				
138-MS-C-080	B3890C005	2-4							.	.	.	.	.
138-MS-C-081	B3890C005	4-6				.		.						.	.	.
138-MS-C-082	B3890C005	14-16	.	.	.		.		.	.	.	.	.	.	.	.
138-MS-C-084	B3890C025	2-4							.	.	.	.	.
138-MS-C-086	B3890C025	0-8				.		.						.	.	.
138-MS-C-087	B3890C025	10-12	.	.	.		.		.	.	.	.	.	.	.
138-MS-C-092	B3890C031	8-10							.	.	.	.	.
138-MS-C-093	B3890C031	10-12	.	.	.		.				
138-MS-C-094	B3890C031	12-14	.			.		.	.		.	.	.
138-MS-C-095	B3890C031	0-10				.		.						.	.	.
138-MS-C-098	B3890C030	4-6	.	.	.		.				
138-MS-C-099	B3890C030	6-8							.	.	.	.	.
138-MS-C-100	B3890C030	10-12	.			.		.	.		.	.	.
138-MS-C-101	B3890C030	0-8				.		.						.	.	.
138-MS-C-104	B3890C021	4-6							.	.	.	.	.
138-MS-C-105	B3890C021	6-8	.	.	.		.				
138-MS-C-106	B3890C021	10-12	.	.	.		.		.	.	.	.	.	.	.
138-MS-C-107	B3890C021	0-8				.		.						.	.	.
138-MS-C-113	B3890C021	10-12	.	.	.		.				
138-MS-C-114	B3890C021	12-14							.	.	.	.	.
138-MS-C-116	B3890C012	0-13.5				.		.						.	.	.
138-MS-C-117	B3890C015	12-14							.		.	.	.
138-MS-C-121	B3890C033	3-5							.	.	.	.	.
138-MS-C-122	B3890C033	5-7	.	.	.		.		.	.	.	.	.	.	.
138-MS-C-124	B3890C027	2-4							.	.	.	.	.
138-MS-C-125	B3890C027	4-6	.	.	.		.				
138-MS-C-126	B3890C027	0-7				.		.						.	.
138-MS-C-127	B3890C027	8-10	.	.	.		.		.	.	.	.	.	.	.	.
138-MS-C-131	B3890C015	6-8									
138-MS-C-133	B3890C015	10-12			

138-MS-134

B3890C033

0-2

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•

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•

•

138-MS-225

B3890C001-2

0-8

•

•

•

•

•138-

138-MS-340

B3890C010-1

0-2

Total (148)

(34)

70

73

68

38

68

45

76

72

76

76

76

71

73

35

Table 2-4

Sampling Frequency and Analyses for Chemical Parameters in Soil, MISS Storage File

Page 1 of 5

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	TCLP Pest.	TCLP Herb.	Corr.	React.	Mobile Ions
138-PI-0001	B3890CP018	0-2				•		•	•						•	
138-PI-0002	B3890CP018	2-6				•		•	•						•	
138-PI-0003	B3890CP018	6-8		•	•	•	•	•	•						•	
138-PI-0004	B3890CP018	8-12				•		•	•						•	
138-PI-0005	B3890CP018	12-14				•		•	•						•	
138-PI-0006	B3890CP019	0-2				•		•	•						•	
138-PI-0007	B3890CP019	2-6				•		•	•						•	
138-PI-0008	B3890CP019	6-8				•		•	•						•	
138-PI-0009	B3890CP019	8-12				•		•	•						•	
138-PI-0010	B3890CP019	12-14				•		•	•						•	
138-PI-0011	B3890CP010	0-2		•	•		•	•	•						•	
138-PI-0012	B3890CP010	2-4		•	•		•	•	•						•	
138-PI-0014	B3890CP010	6-8		•	•		•	•	•						•	
138-PI-0015	B3890CP010	8-10				•		•	•						•	
138-PI-0016	B3890CP011	0-2				•		•	•						•	
138-PI-0017	B3890CP011	2-6		•	•		•	•	•						•	
138-PI-0018	B3890CP011	6-8		•	•		•	•	•						•	
138-PI-0019	B3890CP031	0-2				•		•	•						•	
138-PI-0020	B3890CP031	2-6				•		•	•						•	
138-PI-0021	B3890CP031	6-8				•		•	•						•	
138-PI-0038	B3890CP032	0-2		•	•		•	•	•						•	
138-PI-0039	B3890CP032	2-6				•		•	•						•	
138-PI-0040	B3890CP032	6-8				•		•	•						•	
138-PI-0041	B3890CP032	8-10				•		•	•						•	
138-PI-0042	B3890CP032	12-14			•		•	•	•						•	
138-PI-0043	B3890CP035	0-2		•	•		•	•	•						•	
138-PI-0044	B3890CP035	2-7				•		•	•						•	
138-PI-0045	B3890CP035	7-9				•		•	•						•	
138-PI-0046	B3890CP035	9-11				•		•	•						•	
138-PI-0047	B3890CP035	11-13				•		•	•	•	•	•	•	•	•	
138-PI-0048	B3890CP037	0-2				•		•	•						•	
138-PI-0049	B3890CP037	2-6				•		•	•						•	
138-PI-0050	B3890CP037	6-8				•		•	•						•	
138-PI-0051	B3890CP037	8-12		•	•		•	•	•						•	
138-PI-0058	B3890CP028	0-2				•		•	•						•	
138-PI-0059	B3890CP028	2-4		•	•		•	•	•						•	
138-PI-0060	B3890CP028	4-6		•	•		•	•	•						•	

138-PI-0061	B3890CP028	6-8					•	•		•
138-PI-0062	B3890CP028	8-11	•	•		•	•	•		•
138-PI-0063	B3890CP028	11-13			•		•	•		•

Table 2-4
(continued)

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	TCLP Pest.	TCLP Herb.	Corr.	React.	Mobile Ions
138-PI-0064	B3890CP014	0-2				•		•	•						•	
138-PI-0065	B3890CP014	2-6				•		•	•						•	
138-PI-0066	B3890CP014	6-8				•		•	•						•	
138-PI-0067	B3890CP014	8-12		•	•		•	•	•						•	
138-PI-0068	B3890CP027	0-2				•		•	•						•	
138-PI-0069	B3890CP027	2-4				•		•	•	•	•	•	•	•	•	
138-PI-0070	B3890CP027	4-8				•		•	•	•	•	•	•	•	•	
138-PI-0071	B3890CP015	0-2		•	•		•	•	•						•	
138-PI-0072	B3890CP015	2-4				•		•	•						•	
138-PI-0076	B3890CP007	0-2				•		•	•						•	
138-PI-0077	B3890CP007	2-6				•		•	•						•	
138-PI-0078	B3890CP007	6-8				•		•	•						•	
138-PI-0079	B3890CP007	8-12				•		•	•						•	
138-PI-0080	B3890CP008	0-2		•	•		•	•	•						•	
138-PI-0081	B3890CP008	2-6				•		•	•						•	
138-PI-0082	B3890CP008	6-8				•		•	•						•	
138-PI-0083	B3890CP008	8-10				•		•	•						•	
138-PI-0084	B3890CP008	10-12				•		•	•						•	
138-PI-0085	B3890CP008	10-12							•	•	•	•	•	•		
138-PI-0086	B3890CP017	0-2				•		•	•						•	
138-PI-0087	B3890CP017	2-4				•		•	•						•	
138-PI-0088	B3890CP017	6-9				•		•	•						•	
138-PI-0089	B3890CP017	6-8				•		•	•						•	
138-PI-0090	B3890CP016	9-11.1				•		•	•						•	
138-PI-0091	B3890CP016	2-4				•		•	•						•	
138-PI-0092	B3890CP016	4-6		•	•		•	•	•	•	•	•	•	•	•	
138-PI-0093	B3890CP016	6-10				•		•	•						•	
138-PI-0094	B3890CP016	10-12				•		•	•						•	
138-PI-0095	B3890CP016	12-15				•		•	•						•	
138-PI-0099	B3890CP017	11-13				•		•	•						•	
138-PI-0100	B3890CP009	0-2				•		•	•						•	
138-PI-0101	B3890CP009	2-6				•		•	•						•	
138-PI-0102	B3890CP009	6-8		•	•		•	•	•						•	
138-PI-0103	B3890CP009	8-12				•		•	•						•	
138-PI-0104	B3890CP009	8-12				•		•	•						•	
138-PI-0105	B3890CP009	12-14.6				•		•	•						•	
138-PI-0106	B3890CP009	14.6-19				•		•	•						•	

138-PI-0107	B3890CP002	0-2			•		•		•	
138-PI-0108	B3890CP002	2-6			•		•		•	
138-PI-0109	B3890CP002	6-8	•	•		•		•	•	
138-PI-0110	B3890CP002	8-10			•		•		•	

Table 2-4
(continued)

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	TCLP Pest.	TCLP Herb.	Corr.	React.	Mobile Ions
138-PI-0111	B3890CP020	0-2		•	•		•	•	•						•	
138-PI-0112	B3890CP020	2-6		•	•		•	•	•						•	
138-PI-0113	B3890CP020	6-8		•	•		•	•	•						•	
138-PI-0114	B3890CP020	2-6				•		•	•						•	
138-PI-0118	B3890CP012	0-2				•		•	•						•	
138-PI-0119	B3890CP012	2-4				•		•	•						•	
138-PI-0120	B3890CP012	4-8		•	•		•	•	•						•	
138-PI-0121	B3890CP012	8-9.6		•	•		•	•	•						•	
138-PI-0122	B3890CP004	0-2				•		•	•						•	
138-PI-0123	B3890CP004	2-4		•	•			•	•						•	
138-PI-0124	B3890CP004	2-4								•	•	•		•	•	
138-PI-0125	B3890CP004	4-5.6				•		•	•						•	
138-PI-0126	B3890CP004	6-8				•		•	•						•	
138-PI-0127	B3890CP003	0-2		•	•		•	•	•						•	
138-PI-0128	B3890CP003	2-4		•	•		•	•	•						•	
138-PI-0129	B3890CP003	4-6				•		•	•						•	
138-PI-0130	B3890CP003	4-6								•	•	•		•	•	
138-PI-0131	B3890CP003	6-8				•		•	•						•	
138-PI-0132	B3890CP003	8-10				•		•	•						•	
138-PI-0133	B3890CP003	10-12				•		•	•						•	
138-PI-0134	B3890CO003	10-12								•	•	•		•	•	
138-PI-0135	B3890CP015	0-2				•		•	•						•	
138-PI-0136	B3890CP015	2-6				•		•	•						•	
138-PI-0137	B3890CP015	6-8				•		•	•						•	
138-PI-0138	B3890CP015	8-12				•		•	•						•	
138-PI-0142	B3890CP006	0-2				•		•	•						•	
138-PI-0143	B3890CP006	2-6				•		•	•						•	
138-PI-0144	B3890CP006	6-8				•		•	•						•	
138-PI-0145	B3890CP006	8-12				•		•	•						•	
138-PI-0146	B3890CP030	0-2				•		•	•						•	
138-PI-0147	B3890CP030	2-4				•		•	•						•	
138-PI-0148	B3890CP030	4-8				•		•	•						•	
138-PI-0149	B3890CP030	4-8				•		•	•						•	
138-PI-0150	B3890CP030	8-9.1				•		•	•						•	
138-PI-0151	B3890CP022	0-2				•		•	•						•	
138-PI-0152	B3890CP022	2-6				•		•	•						•	
138-PI-0156	B3890CP022	6-8		•	•		•	•	•						•	
138-PI-0157	B3890CP022	8-10				•		•	•						•	

Table 2-4
(continued)

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	TCLP Pest.	TCLP Herb.	Corr.	React.	Mobile Ions
138-PI-0161	B3890CP024	0-2				•		•	•						•	
138-PI-0162	B3890CP024	2-4				•		•	•						•	
138-PI-0163	B3890CP024	4-6				•		•	•						•	
138-PI-0164	B3890CP024	6-10				•		•	•						•	
138-PI-0165	B3890CP024	10-12				•		•	•						•	
138-PI-0166	B3890CP024	10-12								•	•	•		•		
138-PI-0167	B3890CP030	9-10.7				•		•	•						•	
138-PI-0168	B3890CP030	9-10.7								•	•	•		•		
138-PI-0169	B3890CP030	10.7-13.1				•		•	•						•	
138-PI-0176	B3890CP033	0-2				•		•	•						•	
138-PI-0177	B3890CP033	2-4				•		•	•						•	
138-PI-0178	B3890CP029	0-2				•		•	•						•	
138-PI-0179	B3890CP029	0-2								•	•	•		•		
138-PI-0180	B3890CP029	2-4				•		•	•						•	
138-PI-0181	B3890CP036	0-2				•		•	•						•	
138-PI-0182	B3890CP036	2-4								•	•	•		•		
138-PI-0183	B3890CP036	2-4				•		•	•						•	
138-PI-0184	B3890CP013	0-2				•		•	•						•	
138-PI-0185	B3890CP013	2-4				•		•	•						•	
138-PI-0186	B3890CP021	0-2				•		•	•						•	
138-PI-0187	B3890CP021	2-4				•		•	•						•	
138-PI-0188	B3890CP021	2-4								•	•	•		•		
138-PI-0192	B3890CP023	0-2				•		•	•						•	
138-PI-0193	B3890CP023	2-4				•		•	•						•	
138-PI-0194	B3890CP023	2-4								•	•	•		•		
138-PI-0195	B3890CP023	6-8.5				•		•	•						•	
138-PI-0196	B3890CP023	0-0.5									•	•		•		
138-PI-0197	B3890CP034	0-2				•		•	•						•	
138-PI-0198	B3890CP034	2-4				•		•	•						•	
138-PI-0199	B3890CP034	2-4								•	•	•		•		
138-PI-0200	B3890CP034	4-6				•		•	•						•	
138-PI-0201	B3890CP034	6-8				•		•	•						•	
138-PI-0202	B3890CP034	6-8								•	•			•		
138-PI-0206	B3890CP005	0-2				•		•	•			•			•	
138-PI-0207	B3890CP005	2-6				•		•	•						•	
138-PI-0208	B3890CP005	6-8.5				•		•	•						•	
138-PI-0209	B3890CP005	6-8.5								•	•	•		•		

138-PI-0210	B3890CP001	0-2
138-PI-0211	B3890CP001	2-6

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Table 2-4
(continued)

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	Pest.	Herb.	Corr.	React.	Mobile Ions
138-PI-0212	B3890CP026	0-2				•		•	•							•
138-PI-0213	B3890CP026	2-4				•		•	•							•
138-PI-0214	B3890CP026	2-4								•	•	•			•	
138-PI-0215	B3789CP026	4-6				•		•	•							•
138-PI-0216	B3890CP025	0-2				•		•	•							•
138-PI-0217	B3890CP025	2-4				•		•	•							•
Total (167)	(37)			28	29	122	28	150	152	19	20	20	5	20		151

Table 2-5
Sampling Frequency and Analyses for Chemical Parameters in Soil, Residential Vicinity Properties

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	TCLP Pest.	TCLP Herb.	Corr.	React.	Mobile Ions
138-VPC-001	B3890C352	0-2	•			•		•	•						•	•
138-VPC-002	B3890C352	2-4	•			•		•	•						•	•
138-VPC-003	B3890C353	0-2	•			•		•	•						•	•
138-VPC-004	B3890C353	2-4	•			•		•	•						•	•
138-VPC-005	B3890C353	4-6	•			•		•	•						•	•
138-VPC-011	B3890C364	0-2	•			•		•	•					•	•	•
138-VPC-012	B3890C364	2-4	•			•		•	•					•	•	•
138-VPC-013	B3890C364	4-6	•			•		•	•					•	•	•
138-VPC-027	B3890C375	0-2	•			•		•	•					•	•	•
138-VPC-028	B3890C375	2-4	•			•		•	•					•	•	•
138-VPC-029	B3890C375	4-6	•			•		•	•					•	•	•
138-VPC-030	B3890C375	6-8	•			•		•	•					•	•	•
Total (12)	(4)		12			12		7	12					7	12	12

Table 2-6
Sampling Frequency and Analyses for Chemical Parameters in Soil, Commercial/Governmental Vicinity Properties

Sample ID	Borehole ID	Sampling Depth (ft)	Metals and Rare Earths	VOCs	BNAEs	PCBs	Pest./PCBs	TPH	TCLP Metals	TCLP VOCs	TCLP BNAEs	TCLP Pest.	TCLP Herb.	Corr.	React.	Mobile Ions
138-MWC-001	B3890C530	0-2	•			•		•	•					•	•	•
138-MWC-002	B3890C530	2-4	•			•		•	•					•	•	•
138-MWC-003	B3890C530	4-6	•	•	•		•	•	•					•	•	•
138-MWC-004	B3890C530	6-8	•			•		•	•					•	•	•
138-MWC-015	B3890C570	0-2	•	•	•		•	•	•					•	•	•
138-MWC-016	B3890C570	2-4	•			•		•	•					•	•	•
138-MWC-017	B3890C570	4-6	•			•		•	•					•	•	•
138-MWC-018	B3890C570	6-7.2	•			•		•	•					•	•	•
138-MWC-020	B3890C622	0-2	•			•		•	•	•	•	•		•	•	•
138-MWC-021	B3890C622	2-4	•			•		•	•	•	•	•		•	•	•
138-MWC-022	B3890C622	4-6	•			•		•	•	•	•	•		•	•	•
138-MWC-033	B3890C628	0-2	•	•	•		•	•	•					•	•	•
138-MWC-034	B3890C628	2-4	•			•		•	•					•	•	•
138-MWC-035	B3890C628	6-8	•			•		•	•					•	•	•
138-MWC-041	B3890C630	0-2	•			•		•	•					•	•	•
138-MWC-042	B3890C630	2-4	•			•		•	•					•	•	•
138-MWC-043	B3890C630	4-6	•			•		•	•					•	•	•
138-MWC-044	B3890C630	6-8	•			•		•	•					•	•	•
138-MWC-045	B3890C630	8-10	•			•		•	•					•	•	•
Total (19)			19	3	3	16	3	19	19	3	3	3		19	18	18

Table 2-7
Numbers of Surface and Subsurface Soil Samples Analyzed for
Radiological Parameters, Residential and Commercial/Governmental
Vicinity Properties

Operable Subsurface Unit/Property	No. Surface Samples ^a	No. Boreholes Drilled	No. Samples ^a
Residential Vicinity Properties			
70 W. Hunter Avenue	3	5	15
79 Avenue B	17	14	39
90 Avenue C	16	18	49
108 Avenue E	8	12	39
112 Avenue E	15	20	63
113 Avenue E	24	20	63
62 Trudy Drive	11	21	85
136 W. Central Avenue	26	20	68
Total	120	130	421
Commercial/Governmental Vicinity Properties			
200 Rt. 17 (Sears)	36	36	149
Essex Street	27	25	75
Route 17 (Muscarelle)			
113 Essex St. (National Community Bank)	9	34	109
Interstate 80	3	32	97
205 Maywood Avenue (Myron)	13	40	116
Total	88	167	546

^aNumber of samples analyzed for radiological parameters
(U-238, Ra-226 Th-232).

Table 2-8
Target Analyte List - Metals

Aluminum
Antimony
Arsenic
Barium
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Manganese
Mercury
Nickel
Potassium
Selenium
Silver
Sodium
Thallium
Vanadium
Zinc
Cyanide

Source: EPA 1988b.

Table 2-9
Target Compound List

Page 1 of 4

Analyte	Alternate Nomenclature
Volatile Organics	
Chloromethane	Methyl chloride
Bromomethane	Methyl bromide
Vinyl chloride	Chloroethylene
Chloroethane	
Methylene chloride	Dichloromethane
Acetone	
Carbon disulfide	
1,1-Dichloroethene	1,1-Dichloroethylene
1,1-Dichloroethane	
cis-1,2-Dichloroethene	cis-1,2-Dichloroethylene
trans-1,2-Dichloroethene	trans-1,2-Dichloroethylene
Chloroform	
1,2-Dichloroethane	
2-Butanone	Methyl ethyl ketone
1,1,1-Trichloroethane	
Carbon tetrachloride	
Vinyl acetate	
Bromodichloromethane	Dichlorobromomethane
1,1,2,2-Tetrachloroethane	
1,2-Dichloropropane	
cis-1,3-Dichloropropene	cis-1,3-Dichloropropylene
trans-1,3-Dichloropropene	trans-1,3-Dichloropropylene
Trichloroethene	Trichloroethylene
Benzene	
Bromoform	Tribromomethane
2-Hexanone	Methyl butyl ketone
4-Methyl-2-pentanone	Methyl isobutyl ketone
Dibromochloromethane	Chlorodibromomethane
1,1,2-Trichloroethane	
Tetrachloroethene	Tetrachloroethylene
Toluene	Methyl benzene
Chlorobenzene	
Ethyl benzene	
Styrene	
Xylenes (o-, m-, p-)	
2-Chloroethyl vinyl ether	
Acrolein	2-Propenal
Acrylonitrile	Propenenitrile

Table 2-9
(continued)

Page 2 of 4

Analyte	Alternate Nomenclature
Semivolatile Organics	
Phenol	
Bis(2-chloroethyl)ether	
2-Chlorophenol	
1,3-Dichlorobenzene	
1,4-Dichlorobenzene	
Benzyl alcohol	
1,2-Dichlorobenzene	
2-Methylphenol	
Bis(2-chloroisopropyl)ether	
4-Methylphenol	
N-Nitroso-dipropylamine	
Hexachloroethane	
Nitrobenzene	
Isophorone	
2-Nitrophenol	
2,4-Dimethylphenol	
Benzoic acid	
Bis(2-chloroethoxy)methane	
2,4-Dichlorophenol	
1,2,4-Trichlorobenzene	
Naphthalene	
4-Chloroaniline	
Hexachlorobutadiene	
4-Chloro-3-methylphenol	Para-chloro-meta-cresol
2-Methylnaphthalene	
Hexachlorocyclopentadiene	
2,4,6-Trichlorophenol	
2,4,5-Trichlorophenol	
2-Chloronaphthalene	
2-Nitroaniline	
Dimethyl phthalate	
Acenaphthylene	
2,6-Dinitrotoluene	
3-Nitroaniline	
Acenaphthene	Naphthyleneethylene
2,4-Dinitrophenol	
4-Nitrophenol	
Dibenzofuran	
2,4-Dinitrotoluene	
Diethyl phthalate	
4-Chlorophenyl phenyl ether	
Fluorene	
4-Nitroaniline	

Table 2-9
(continued)

Page 3 of 4

Analyte	Alternate Nomenclature
Semivolatile Organics (continued)	
4,6-Dinitro-2-methylphenol	4,6-Dinitro-o-cresol
N-Nitroso-diphenylamine	
4-Bromophenylphenyl ether	
Hexachlorobenzene	
Pentachlorophenol	
Phenanthrene	
Anthracene	
Di-n-butylphthalate	
Fluoranthene	
Pyrene	
Butyl benzyl phthalate	
3,3-Dichlorobenzidine	
Benzo(a)anthracene	1,2-Benzanthracene
Chrysene	
Bis(2-ethylhexyl)phthalate	
Di-n-octyl phthalate	
Benzo(b)fluoranthene	3,4-Benzofluoranthene
Benzo(k)fluoranthene	11,12-Benzofluoranthene
Benzo(a)pyrene	3,4-Benzopyrene
Indeno(1,2,3-cd)pyrene	2,3-o-Phenylene pyrene
Dibenz(a,h)anthracene	1,2,5,6-Dibenzanthracene
Benzo(g,h,i)perylene	1,12-Benzoperylene
Benzidine	
1,2-Diphenylhydrazine	
N-nitrosodimethylamine	
Pesticides/PCBs	
alpha-BHC	
beta-BHC	
delta-BHC	
gamma-BHC	Lindane
Heptachlor	
Aldrin	
Heptachlor epoxide	
Endosulfan I	
Dieldrin	
4,4'-DDE	
Endrin	
Endosulfan II	
4,4'-DDD	

Table 2-9
(continued)

Page 4 of 4

Analyte	Alternate Nomenclature
Pesticides/PCBs (continued)	
Endosulfan sulfate	
4,4'-DDT	
Endrin ketone	
Methoxychlor	
alpha-Chlordane	
gamma-Chlordane	
Toxaphene	
Aroclor-1016	
Aroclor-1221	
Aroclor-1232	
Aroclor-1242	
Aroclor-1248	
Aroclor-1254	
Aroclor-1260	
Endrin aldehyde	

Source: EPA 1988c.

Table 2-10
Monitoring Well Construction Summary

Well Number	Completion Date	Location ^a Northing (ft)	Ground Easting (ft)	Hole/Well Elevation (ft AMSL)	Depth (ft/ft)	Casing and Screen Data		Screen Length ^d To	Casing (ft)	Drill Material ^e	Method ^f	
						Inside CSG/Screen/ Slotted CSG ^b	Diam. (in.)					
MISS-1A	11/06/84	9745.86	9274.65	59.80	12.0/11.4	C	2	+2.1	5.4	6	Sch. 40 PVC Sch. 40 PVC 0.02-in. slot	Auger 0-12.0'
						SC	2	5.4	11.4			
MISS-1B	11/13/84	9747.02	9278.93	60.10	53.5/53.5	C	4	+1.4	23.0	30.5 (OH)	Steel 0-17.0'	Auger WR/NX 17-53.5'
						OH	3	23.0	53.5			
MISS-2A	10/30/84	9973.36	9875.92	59.70	20.0/18.9	C	2	+2.1	6.9	10	Sch. 40 PVC Sch. 40 PVC 0.02-in. slot	Auger 0-20.0'
						SC	2	6.9	16.9			
MISS-2B	11/12/84	9962.48	9888.21	60.20	58.5/58.5	C	2	16.9	18.9	30 (OH)	Sch. 40 PVC Steel	Auger 0-25.8' WR/NX 25.8-58.5'
						OH	6	+1.2	28.5			
MISS-3A	10/25/84	9423.37	9952.38	56.20	15.0/12.7	C	2	+2.3	6.7	6	Sch. 40 PVC Sch. 40 PVC 0.02-in. slot	Auger 0-15.0'
						SC	2	6.7	12.7			
MISS-3B	11/08/84	9427.50	9966.48	56.20	50.0/50.0	C	4	+1.5	20.0	30 (OH)	Steel	Auger 0-16.0' WR/NX 16.0-50.0'
						OH	3	20.0	50.0			
MISS-4A	10/26/84	9216.49	9996.87	55.00	10.0/9.7	C	2	+2.1	4.7	5	Sch. 40 PVC Sch. 40 PVC 0.02-in. slot	Auger 0-10.0'
						SC	2	4.7	9.7			
MISS-4B	11/10/84	9208.18	10008.36	55.30	47.0/47.0	C	4	+1.1	17.0	30 (OH)	Steel	Auger 0-11.5' WR/NX 11.5-47.0'
						OH	3	17.0	47.0			
MISS-5A	11/01/84	9234.38	9602.57	57.40	15.0/14.6	C	2	+1.2	10.7	3.9	Sch. 40 PVC Sch. 40 PVC 0.02-in. slot	Auger 0-15.0'
						SC	2	10.7	14.6			
MISS-5A-1	11/01/84	9235.52	9604.72	57.40	8.0/8.0	C	2	+2.2	3.0	5	Sch. 40 PVC Sch. 40 PVC 0.02-in. slot	Auger 0-8.0'
						SC	2	3.0	8.0			
MISS-5B	11/10/84	9243.48	9596.00	57.40	55.0/55.0	C	4	+2.3	25.0	30 (OH)	Steel	Auger 0-15.8' WR/NX 15.8-55.0'
						OH	3	25.0	55.0			
MISS-6A	10/31/84	9570.62	9576.40	56.60	16.0/15.2	C	2	+1.6	7.2		Sch. 40 PVC	Auger

						SC	2	7.2	13.2	6	Sch. 40 PVC 0.02-in. slot	0-16.0'
						C	2	13.2	15.2		Sch. 40 PVC	
MISS-6B	11/13/84	9578.31	9570.36	56.60	53.0/53.0	C	4	+1.4	23.0		Steel	Auger
						OH	3	23.0	53.0	30 (OH)		0-16.0' WR/NX 16.0-53.0'

Table 2-10

(continued)

Well Number	Completion Date	Location ^a Northing (ft)	Ground Easting (ft)	Hole/Well Elevation (ft AMSL)	Depth (ft/ft)	Casing and Screen Data		Screen Length ^d To	Casing (ft)	Drill Material ^e	Method ^f	
						Inside CSG/Screen/ Slotted CSG ^b	Diam. (in.)					
MISS-7A	11/05/84	9477.62	9431.42	53.10	11.5/9.6	C	2	+2.5	4.6	5	Sch. 40 PVC	Auger 0-11.5'
						SC	2	4.6	9.6		Sch. 40 PVC 0.02-in. slot	
MISS-7B	11/09/84	9471.41	9430.72	53.60	49.0/49.0	C	4	+2.0	19.0	30 (OH)	Steel	Auger 0-14.0' WR/NX 14.0-49.0'
						OH	3	19.0	49.0			
B38W01S	11/21/88	10072.0	9925.8	55.2	23.0/23.0	C	2	+2.0	17.0	5	316L SS	Auger 0-23.0' WR/NX 15.0-19.0'
						S	2	17.0	22.0		316L SS 0.01-in. CW	
B38W02D	11/09/88	10111.1	10443.8	75.1	43.0/43.0	C	2	22.0	23.0	5	316L SS	Auger 0-13.0' WR/NX 13.0-43.0'
						C	10	0	13		Steel	
						C	2	+2.9	37.0		316L SS	
						S	2	37.0	42.0		316L SS 0.01-in. CW	
B38W03B	08/31/87	9428.27	10042.54	56.6	56.3/40.5	C	2	42.0	43.0	9.7	316L SS	Auger 0-11.0' WR/NX 11.0-56.3'
						C	10	0	10.5		Steel	
						C	2	+1.3	29.8		316L SS	
						S	2	29.8	39.5		316L SS 0.01-in. CW	
B38W04B	9/15/87	9564.00	10488.00	62.8	39.7/36.3	C	2	39.5	40.5	5	316L SS	Auger 0-8.5' WR/NX 8.5-39.7'
						C	10	0	10.9		Steel	
						C	2	+2.8	22.7		316L SS	
						S	2	22.7	27.7		316L SS 0.01-in. CW	
B38W05B	09/21/87	9880.00	10772.00	68.1	49.0/44.5	C	2	27.7	36.3	10.3	316L SS	Auger 0-14.4' WR/NX 14.4-49.0'
						C	10	0	16		Steel	
						C	2	+2.9	22.7		316L SS	
						S	2	22.7	33.0		316L SS 0.01-in. CW	
B38W06B	09/10/87	9335.00	10311.00	55.4	36.4/36.4	C	2	33.0	44.5	5	316L SS	Auger 0-11.0' WR/NX 11.0-36.4'
						C	10	0	10.9		Steel	
						C	2	+2.6	15.9		316L SS	
						S	2	15.9	20.9		316L SS 0.01-in. CW	
B38W07B	09/30/87	8990.00	9933.00	51.4	43.2/39.2	C	2	20.9	36.4	10.3	316L SS	Auger 0-8.7' WR/NX 8.7-43.2'
						C	10	0	8.7		Steel	
						C	2	+2.0	18.5		316L SS	
						S	2	18.5	28.8		316L SS 0.01-in. CW	
						C	2	28.8	39.2		316L SS	

B38W12A	10/14/87	8772.53	11630.74	47.2	16.2/14.8	C	2	+2.8	7.4		316L SS	
						S	2	7.4	12.4	5	316L SS	Auger
											0.01-in. CW	0-16.2'
						C	2	12.4	14.8		316L SS	

Table 2-10

(continued)

Well Number	Completion Date	Location ^a Northing (ft)	Ground Easting (ft)	Hole/Well Elevation (ft AMSL)	Depth (ft/ft)	Casing and Screen Data		Screen Length ^d To	Casing (ft)	Drill Material ^e	Method ^f			
						Inside CSG/Screen/ Slotted CSG ^b	Diam. (in.)							
B38W12B	10/21/87	8768.28	11638.37	47.3	55.0/50.3	C	10	0	10.4	Steel	Auger			
						C	2	+2.3				23.1	316L SS	0-23.1'
						S	2	34.5				44.9	316L SS	WR/NX
													0.01-in. CW	23.1-55.0'
B38W14S	11/04/88	9030.95	8931.07	45.4	14.0/13.0	C	2	-0.5	5	316 SS	Auger			
						S	2	8.0				13.0	316 SS	0-14.0'
B38W14D	11/03/88	9032.05	8938.17	45.3	52.0/51.5	C	10	0	5.5	Steel	Auger			
						C	2	-0.5				22.5	316 SS	0-22.5'
						S	2	46.0				51.5	316 SS	WR/NX
													0.01-in. CW	22.5-52.0'
B38W15S	10/28/88	8893.2	9142.5	47.3	16.5/16.5	C	2	-0.3	5	316 SS	Auger			
						S	2	10.5				15.5	316 SS	0-16.5'
													0.01-in. CW	
B38W15D	10/30/88	8898.08	9142.87	47.3	47.5/46.0	C	10	-0.5	5	Steel	Auger			
						C	2	-0.5				20.0	316 SS	0-20.0'
						S	2	40.0				45.0	316 SS	WR/NX
													0.01-in. CW	20.0-47.5'
B38W17A	10/09/87	8888.6	9710.1	50.5	15.0/14.1	C	2	+2.5	5	316L SS	Auger			
						S	2	7.6				12.6	316L SS	0-15.0'
													0.01-in. CW	
B38W17B	10/09/87	8892.90	9712.4	50.5	45.0/44.4	C	10	0	10.3	Steel	Auger			
						C	2	+2.7				15	316L SS	0-15.0'
						S	2	18.7				29.0	316L SS	WR/NX
													0.01-in. CW	15.0-45.0'
B38W18D	10/21/88	9793.39	10107.73	58.2	41.2/41.0	C	2	29.0	5	316L SS	Auger			
						C	2	44.4				41.0	316L SS	0-12.0'
						S	2	NA ^g				NA	316L SS	WR/NX
													0.01-in. CW	12.0-41.2'
B38W19S	10/12/89	9364.4	9506.3	57.3	16.0/15.8	C	2	+2.3	2	316 SS	Auger			
						S	2	35.0				40.0	316 SS	0-16.0'
													0.01-in. CW	
B38W19D	10/12/89	9359.9	9515.1	57.4	48.5/47.9	C	2	14.9	10.2	316 SS	Auger			
						S	2	+2.3				21.7	316 SS	0-17.3'

C	2	31.9	47.9	0.01-in. CW 316 SS	WR/NX 17.3-48.5'
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Source: BNI 1985f; BNI borehole logs (Draft) and well construction logs (Draft)

Table 2-10

(continued)

^aLocation = coordinates from site-specific MISS grid.

^bCSG = Casing; C = Blank casing; SC = Slotted casing; S = Screen; OH = Open hole.

^c+ symbol = Above ground surface; - symbol = Below ground surface.

^dOH = Open hole.

^ePVC = polyvinyl chloride; SS = Stainless steel; CW = Continuous wrap.

^fWR = Wet rotary; NX = NX core.

^gNA = Information not available.

3.0 PHYSICAL CHARACTERISTICS OF THE STUDY AREA

This section describes the physical and environmental characteristics of the site that are relevant to identifying and evaluating potential transport pathways, mechanisms, and receptors.

The information presented here provides a foundation for the discussions of the nature and extent of contamination and contaminant fate and transport in Sections 4.0 and 5.0, respectively.

Section 3.0 is organized as follows: Surface Features (3.1); Meteorology (3.2); Surface Water Hydrology (3.3); Site Geology (3.4); Hydrogeology (3.5); Demography and Land Use (3.6); and Ecology (3.7).

3.1 SURFACE FEATURES

The surface features described in this section are primarily cultural or man-made features (e.g., buildings, roads, railroads, and parking lots) found on MISS, the Stepan property, and the vicinity properties.

3.1.1 MISS

MISS contains a covered interim storage pile, two buildings, temporary office trailers, an effluent reservoir, and two railroad spurs. Most of the property is covered with grass. A conduit underlying the northwest corner of the property carries Westerly Brook to a discharge point west of MISS.

Before industrial activities began on MISS, a marshy area existed in the southeastern corner of the property. Another remnant feature is the former channel of Westerly Brook, which runs across the southwestern corner of the property. The current surface material is fill mixed with waste material from process operations at the former MCW.

3.1.2 Stepan Property

The Stepan property contains office buildings, chemical production facilities, warehouse storage areas, material laydown areas, a railroad spur, liquid storage tanks, and parking lots. The property is underlain by a number of utilities and storage tanks. A railroad spur transects an undeveloped open area adjacent to MISS and continues across MISS. Stormwater runoff is collected on the property and channeled to an extensive network of storm sewers.

3.1.3 Vicinity Properties

The vicinity properties discussed in this report are located in a densely populated and highly developed commercial area. Most of the properties are along the former channel of Lodi Brook. Residential properties are predominantly single-family dwellings with lawns and landscaping. Some residential properties have unattached garages and outside storage buildings. None of the residences studied in this RI have aboveground or inground swimming pools.

Commercial/governmental properties are primarily small businesses, with one building surrounded by asphalt parking areas and grass.

3.2 METEOROLOGY

The regional climate is humid, with a normal annual precipitation of about 107 cm (42.3 in.) and approximately 120 days of precipitation per year. August, the wettest month, averages 11 cm (4.3 in.) of rain. The area receives approximately 77 cm (30 in.) of snow per year. About 25 to 30 thunderstorms and an average of less than one tornado (statewide) occur annually. Floods sometimes accompany heavy rains associated with tropical storms. Prolonged droughts are rare, typically occurring only once every 15 years. Normal monthly temperatures range from a January low of -0.4°C (31.3°F) to a July high of 24.9°C (76.8°F); the average annual temperature is 12.3°C (54.2°F).

Table 3-1 summarizes climatological data for the Newark area [24 km (15 mi) south-southwest of MISS] for the period 1951-1980. Average monthly wind speeds range from 14 to 19.3 km/h (8.7 to 12 mph), with the predominant wind direction from the southwest. Data are from the National Oceanic and Atmospheric Administration (Gale Research Company 1985).

Air quality monitoring stations in Bergen County are located in Cliffside Park, Fort Lee, and Hackensack. During 1987, these monitoring stations measured sulfur dioxide, ozone, nitrogen oxides, carbon monoxide, trace metals, inhalable particulates, particulate organic matter, and smoke shade (NJDEP 1988). Overall air quality was rated "good" for 185 days, "moderate" for 168 days, "unhealthful" for 9 days, and "very unhealthful" for 1 day (data were not available for 2 days during the year). In 1987, for the first time, all New Jersey stations monitoring ozone levels reported violations of the primary ambient air quality standards. Cliffside Park reported that ozone levels exceeded the state and federal maximum daily 1-h average of 0.12 ppm (235 $\mu\text{g}/\text{m}^3$) on 9 days. However, other pollutants monitored in Bergen County remained within state and federal standards.

During the fall and winter of 1986-1987, NJDEP conducted a statistical sampling in which New Jersey homes were screened for radon. The statewide average for the screened homes was 5.2 pCi/L; values ranged from 0.1 to 246 pCi/L. In Bergen County, the average

was 1.81 pCi/L, with a range of 0.3 to 19.1 pCi/L (Camp Dresser and McKee 1989).

3.3 SURFACE WATER HYDROLOGY

This section describes the bodies of surface water into which the Maywood Site drains (the receiving waters), site drainage characteristics, water balance elements, potential flood-flows, and site erosion.

3.3.1 Receiving Waters

The Saddle River is the major body of water into which Maywood Site properties drain (via Westerly Brook and Lodi Brook). Figure 3-1 shows the site area, the drainage basins of Westerly and Lodi brooks, and the location of the Saddle River.

Westerly Brook

Westerly Brook drains an area of approximately 1 km² (0.4 mi²) in Maywood and Rochelle Park (Figure 3-1). The area contains mainly residential properties and some industrial sites. The brook begins as a natural channel and flows southward for 975 m (3,200 ft) as an open channel before it enters a culvert through which it flows for 585 m (1,920 ft) beneath MISS. The brook resurfaces and flows another 183 m (600 ft) to its confluence with the Saddle River.

Downstream from MISS, the natural channel of Westerly Brook is approximately 4.6 m (15 ft) wide and has a flow depth of 0.3 m (1 ft) or less. The channel slope is less than 1 percent, so flow velocities are low. The banks are well defined, with a bank-full depth of approximately 3.7 m (12 ft).

Westerly Brook is a continuous stream fed by groundwater. A stream gauging site has never existed on the stream; however, the base flow was visually estimated to be 0.1 m³/s (4 cfs) (an order-of-magnitude estimate) in June 1991. Westerly Brook was routed

through the underground culvert in the early 1970s. Before that time, it flowed in an open channel through the MISS and Ballod properties along the same course as the present underground culvert. All of the surface water runoff from MISS and the Ballod property flowed into Westerly Brook.

Lodi Brook

Lodi Brook drains an area of approximately 1.3 km² (0.5 mi²) (Figure 3-1). The average basin slope is 1.7 percent. The brook begins on the Sears property in a low marshy area that collects runoff from the Sears and Stepan properties; from there it flows southward under Route 17 through a box culvert, remaining underground for most of its course except for small sections on both sides of Interstate 80 and a small section along Route 17. From this area, the brook flows approximately 2.9 km (1.8 mi) before joining the Saddle River 2.9 km (1.8 mi) downstream of the confluence of Westerly Brook and the Saddle River. Lodi Brook is a continuous stream. The base flow was visually estimated to be approximately 0.06 m³/s (2 cfs) (an order-of-magnitude estimate) in June 1991.

The southern reach of Lodi Brook was routed through the underground culvert in the late 1940s. The headwaters of Lodi Brook on the Sears property were altered in the late 1960s by the construction of the Sears building. Figure 3-1 shows the historical channels of Lodi Brook before the brook was routed through underground culverts. The brook had a flat floodplain, which allowed parts of the channel to migrate laterally. There has never been a gauging station on Lodi Brook.

Saddle River

The Saddle River has a drainage area of approximately 155 km² (60 mi²). The headwaters are located approximately 2.4 km (1.5 mi) north of the New Jersey state line. The river flows southward into New Jersey, continuing for approximately 25.7 km (16 mi) before it

joins the Passaic River.

Since 1923, a U.S. Geological Survey (USGS) gauging station has been located on the Saddle River in Lodi, 5.1 km (3.2 mi) upstream from the mouth of the Saddle River (USGS 1991). The long-term average flow of the Saddle River at Lodi is 2.83 m³/s (100 cfs). The peak instantaneous flow of 11.3 m³/s (400 cfs) occurred in 1977, with a stage of 3.8 m (12.4 ft); the instantaneous low flow of 0.03 m³/s (1.0 cfs) occurred in 1938. The average annual runoff in the Saddle River basin is 63.2 cm (24.9 in.).

A water intake is located on the Saddle River at Arcola, New Jersey, approximately 4 km (2.5 mi) north of MISS. Water is pumped from the Saddle River into the Oradell Reservoir on the Hackensack River. No diversions exist on the Saddle River below Arcola.

Aerial photographs show that the Saddle River has maintained the same course in the reach to the south of Essex Street since 1940. The river channel to the north of Essex Street was straightened in the early 1960s by the construction of Interstate 80.

3.3.2 Drainage Characteristics

MISS

MISS covers 4.7 ha (11.7 acres) and has an average slope of 1.2 percent. The topography is therefore generally flat, ranging from approximately 15.2 m to 20.4 m (50 to 67 ft) above MSL in some areas (not including the waste pile); the mean elevation is 17.5 m (54.7 ft). The highest elevations are in the northeastern portion of the property. Small mounds and ditches cover MISS as a result of the process waste stored by MCW.

Most of MISS is covered with grass; the exceptions are the interim waste storage pile, the unpaved roads, and the railroad spurs. Because of the low surface gradient and grass cover, erosion and sediment transport from the site are minimal.

MISS can be divided into three separate drainage areas (Figure 3-2). The northwestern drainage area accounts for about

14 percent of the site. Overland flow from this section drains toward a closed depression between the site and the New York, Susquehanna, and Western Railroad. This depression also receives runoff from the Stepan property. The depression holds a volume of more than 2.5 cm (1 in.) of surface runoff from a single storm event; outflow occurs only during periods of heavy rainfall.

The second drainage area covers approximately 59 percent of MISS and includes the runoff from most of the pile. Overland flow from this area is conveyed along the railroad spur to a depression beside Route 17. The water in the depression either infiltrates or flows into the Westerly Brook culvert.

Runoff from the southeastern drainage area (approximately 27 percent of MISS) collects in a small drainage channel that originates in the western part of the Sears property. This channel joins Lodi Brook south of Route 17.

Stepan property

The Stepan property covers 7.4 ha (18.2 acres). Buildings cover approximately two-thirds of the property; the remaining third consists of streets, parking lots, and grass-covered areas.

The topography of Stepan has been modified into a series of terraces to accommodate construction of the operating facility. Topographic relief from the highest terrace at the north side to the lowest terrace at the south side of the property is 7.6 m (25 ft). The average slope of the property is 1.8 percent.

Stormwater runoff from Stepan drains into either Westerly Brook or Lodi Brook. Runoff from approximately one-third of the Stepan property runs onto MISS and collects in the northernmost railroad spur. The other two-thirds of the Stepan property drains toward the southeast into the low marshy area that forms the headwaters of Lodi Brook.

Vicinity properties

Most of the vicinity properties lie along the former channel of Lodi Brook. The properties are currently in heavily urbanized areas and are classified as residential, commercial, or governmental. Before urbanization, the area along Lodi Brook consisted of partially wooded fields at the bottom of a shallow valley. The wide, flat valley floor was subject to flooding before the brook was routed through an underground conduit. The properties immediately north of Highway 46 are low-lying with marshy areas on both sides of the brook.

The difference in elevation from the upper properties to the lower properties is approximately 7.6 m (25 ft). The properties are in a line approximately 1.6 km (1 mi) along Lodi Brook.

3.3.3 Water Balance

The CREAMS model (a field scale model for Chemicals, Runoff, and Erosion from Agricultural Management Systems) was used to estimate the average annual surface runoff from MISS into the receiving waters. CREAMS, developed by the U.S. Department of Agriculture (Knisel 1980), generates estimates of surface runoff, evapotranspiration, and deep percolation using data on daily precipitation, temperature, and physical properties of the soil in the root zone.

The site is composed mainly of grassy areas with some impervious features. In the water balance calculation, the interim storage pile, buildings, unpaved roads, and railroad spurs (about one-fourth of MISS) are all considered impervious areas directly connected to the drainage channels, and it is assumed that precipitation falling on the impervious areas becomes surface runoff.

The surface soil at MISS is composed of more than 50 percent sand particles; the rest consists of varying amounts of silt and clay. It was assumed for modeling purposes that all of the soil in the root zone is sandy loam. The following average values for soil

properties were used in the model:

<u>Soil Parameter</u>	<u>Value</u>
Saturated conductivity, in./h	0.30
Field capacity, in./in.	0.22
Soil porosity, in./in.	0.40
Wilting point, in./in.	0.08

The Soil Conservation Service (SCS) curve number was estimated to be 60 for a sandy range condition, and the rooting depth was estimated to be 91.4 cm (36 in.) because the site is heavily vegetated.

Twelve years (1979-1990) of daily precipitation data recorded at the Lodi National Weather Service station were input to the model. The Lodi weather station is approximately 1.6 km (1 mi) from MISS. Annual precipitation for these years averaged 123.2 cm (48.5 in.). Average monthly temperature and solar radiation data input to the model came from the Central Park (New York) station, which is approximately 16 km (10 mi) southeast of MISS. Central Park is the closest weather station to MISS that has solar radiation records. These average annual water balance elements are:

<u>Water Balance Elements</u>	<u>Volume</u>
Precipitation	48.5 in.
Surface runoff	12.2 in.
Evapotranspiration	22.1 in.
Percolation	14.2 in.

Approximately 25 percent of the total precipitation onto MISS becomes surface runoff and enters either Westerly Brook or Lodi Brook. The remaining 75 percent infiltrates into the soil, from which about 45 percent reenters the atmosphere, through either soil evaporation or transpiration from plant leaves; the remaining 30 percent continues percolating below the root depth and becomes recharge to the groundwater system.

3.3.4 Flood Frequency

Peak flows at MISS for 24-h storms were estimated using the U.S. Army Corps of Engineers HEC-1 computer model (USCOE 1981), which simulates storm runoff in a drainage basin that results from a precipitation event. HEC-1 was used to estimate the standard 2-, 5-, 10-, 25-, 50-, and 100-yr frequency peak flows at MISS.

The precipitation amounts for the site for different storm frequencies were derived from National Weather Service publications HYDRO-35 and Technical Paper No. 40 (Frederick 1977; Hershfield 1961). The precipitation amounts (in inches) are listed below.

<u>Duration</u>	<u>2 yr</u>	<u>5 yr</u>	<u>10 yr</u>	<u>25 yr</u>	<u>50 yr</u>	<u>100 yr</u>
5 min	0.42	0.50	0.55	0.64	0.70	0.77
15 min	0.79	0.98	1.11	1.30	1.45	1.60
60 min	1.3	1.7	2.0	2.4	2.7	3.0
2 h	1.7	2.2	2.7	3.1	3.3	3.7
3 h	2.0	2.6	2.9	3.3	3.7	4.2
6 h	2.3	3.1	3.6	4.2	4.5	5.2
12 h	2.8	3.6	4.4	5.1	5.7	6.2
24 h	3.3	4.3	5.2	5.8	6.5	7.5

HEC-1 generated hypothetical 24-h storm hydrographs from these input precipitation amounts for the durations shown. The SCS curve number method and the dimensionless unit hydrograph procedure were used in generating the storm hydrographs. Stormwater runoff peaks from MISS into Westerly Brook for each of the design storms are shown below. The peak flow/return period relationship is shown in Figure 3-3.

<u>Return Period</u>	<u>Peak Flows (cfs)</u>
2-yr	5.5
5-yr	10.2
10-yr	14.6
25-yr	19.2
50-yr	22.8
100-yr	27.6

The 100-yr floodplain delineated by the Federal Emergency Management Agency (FEMA 1981, 1984, 1990) for the Maywood area is shown in Figure 3-4. MISS and most of the vicinity properties are not located within this 100-yr floodplain; however, portions of a few vicinity properties at the south end of Lodi Brook are in the 100-yr floodplain.

3.3.5 Sediment Yield

Because some surface soil at MISS is contaminated, erosion and sediment transport can cause contaminant migration from the site. The Modified Universal Soil Loss Equation (MUSLE) was used to

estimate the average annual sediment yield from MISS (EPA 1988f). The sediment yield estimates generated with MUSLE are based on the total runoff, the peak discharge, the ability of the particular soils to erode, the length and gradient of the ground surface, and the ground cover.

The daily precipitation (1979-1990) at the Lodi National Weather Service station was used to estimate the average annual sediment yield from MISS, and the total runoff and peak discharge were estimated for each storm event in the 12-year period. The following values were used in the MUSLE equation:

<u>Parameter</u>	<u>Value</u>
Soil erodibility, K	0.24
Length-slope, LS	0.16
Ground cover, CP	0.013

The sediment yield was estimated for each storm event.

The estimated average annual sediment yield from MISS is 0.3 metric ton/yr (0.3 ton/yr). The other properties would have a lower rate of erosion than MISS, depending on the amount of paved area at each site.

The historical sediment yield from the disturbed areas on the MCW, Ballod, and Sears properties was also estimated using MUSLE. A series of aerial photographs dating from 1940 to 1983 were reviewed, and the total area of disturbed soil at each site was estimated as given below:

<u>Property</u>	<u>Disturbed area (acres)</u>
MCW	8.1
Ballod	6.7
Sears	13.5

A value of 0.45 was used for the ground cover factor for bare soil. The daily precipitation was recorded at Newark, New Jersey (1948-1983).

The estimated average annual sediment yield from each site is shown below:

<u>Property</u>	<u>Sediment Yield (tons)</u>
MCW	13.4
Ballod	10.9
Sears	28.8

Both MCW and the Ballod properties drain into Westerly Brook. The Sears property drains into Lodi Brook.

3.4 SITE GEOLOGY

3.4.1 Regional Geology

The Maywood Site is located in northeastern New Jersey within the glaciated section of the Piedmont Plateau. The terrain is generally level, with minor relief. Elevations range from 15 to 25 m (45 to 75 ft) above MSL. Surface topography of the Piedmont region slopes gently to the west and is poorly drained (Cole et al. 1981). Drainage around the Maywood/Lodi area is primarily toward the south via the Passaic/Saddle and Hackensack rivers, which flow into the Hudson River and ultimately into the Atlantic Ocean.

The site lies within the geologic structure known as the Newark Basin (Figure 3-5), which extends southwestward from the Hudson River Valley of New York to southeastern Pennsylvania. The northeastern and northwestern margins of the basin are bordered by Precambrian and early Paleozoic rocks of the southwestern prongs of the New England Upland. The southeastern and southwestern portions of the basin overlie and are bordered by Paleozoic and Precambrian rocks of the Blue Ridge and Piedmont Provinces (Olsen 1980). Crystalline rocks of Precambrian age underlie most of northern New Jersey and adjacent portions of New York. These rocks are primarily gneisses or granite-like rocks of metasedimentary origin that have been intruded by igneous magmas. The various Precambrian lithologies within the area have been structurally imprinted by both the Alleghenian and Taconian orogenies. The Precambrian rocks

form part of a mountainous northeast-trending belt across northern New Jersey known as the New Jersey Highlands. To the east, these rocks are deeply buried beneath Triassic/Jurassic rocks of the Newark Basin group.

Sedimentation within the Newark Basin occurred along the margin of a plate boundary in a zone of essentially east-to-west extension. Structurally, the bedrock exhibits a monoclinial dip and contains shallow open folds (Carswell and Rooney 1976). Stratigraphic data indicate that the basin was strongly asymmetric, taking on the characteristics of an echelon tilted blocks (Manspeizer 1980). High-angle faults within the Triassic/Jurassic Newark Group sediments step down to the east and are tilted to the south. The beds of the Newark Group are characterized by steeply dipping north-to-northeast striking joints that parallel the strike of the beds in the Hackensack River basin. A less prominent set of nearly vertical joints roughly parallels the direction of the dip of the beds (Carswell 1976).

North-trending faults in the Triassic/Jurassic formations are bounded on the northwest by the northeast-trending Ramapo Fault. The Ramapo Fault forms the western margin of the Newark Basin and is at its nearest location approximately 21 km (13 mi) west-northwest of the Maywood Site. The fault has had a long tectonic history, and considerable seismic activity has occurred along its trace in northern New Jersey/eastern New York (Algermissen 1983; USGS undated). This area appears to be part of a broad, diffuse region of seismic activity that extends north-northeastward from New Jersey to New Brunswick, Canada. Although numerous earthquakes have been recorded locally, they are typically of low magnitude and cause little structural damage.

Sediments within the Newark Basin rest with a profound unconformity on basement rocks and dip 5 to 25 degrees to the northwest (Olsen 1980). The stratigraphic section is composed predominantly of red clastics with minor amounts of interstratified basaltic igneous rocks. The entire stratigraphic column reaches a cumulative trigonometrically calculated thickness of over 10,300 m (33,800 ft) (Olsen 1980).

The Newark Basin stratigraphic sequence referred to as the Newark Supergroup is composed of 10 mappable units. The lowermost formations, Stockton and Lockatong, are Triassic. The remainder of the section is referred to by Lyttle and Epstein (1987) as the Brunswick Group. The lowermost unit of the Brunswick Group underlies the site; referred to as the Passaic Formation, this unit reaches a thickness in excess of 8,000 ft and is uppermost Triassic to lower Jurassic in age. The Passaic Formation consists primarily of interlayered dark to moderate reddish-brown, fine-grained sandstones and siltstones. These sediments were probably deposited in a semiarid climate, which favors the stabilization of the red iron-bearing pigments in the mineral matrix.

Redbeds of the Passaic Formation are exposed as ridges and hills in the Maywood vicinity; however, most areas are mantled by unconsolidated Pleistocene and recent deposits. The surface topography of the bedrock underwent considerable change during Pleistocene glacial events. The area was scoured and filled, drainage patterns were altered, and several morainal lakes were created. Wisconsin-age morainal and stratified and unstratified drift deposits are common in the area. Figure 3-6 shows the southernmost advance of Wisconsin glacial ice, and Figure 3-7 shows the distribution of glacial till and drift in northern New Jersey.

Ridges formed by these deposits have a northeast-southwest lineation, which approximates the direction of ice movement. Drift deposits generally conform to the lithologic character of the underlying redbeds in most localities; however, in some areas of northwest Bergen County, lithologies of the drift deposits do not reflect local bedrock conditions (Tedrow 1986). North of Paterson, the redbeds are predominantly covered by drift deposits containing clasts of gneissic composition. Clasts are seen to a lesser degree in drift in the area around the Maywood Site.

During the late Wisconsin, much of the area extending from south of Newark, New Jersey, northward to Tappan, New York, was covered by the preglacial Lake Hackensack (shown in Figure 3-8). Lake Hackensack basin sediments consist of varved clays and stratified sands up to 30 m (98 ft) thick (Reeds 1926). During

glacial retreat, the melting ice deposited layers of sediments over the irregular bottom of Lake Hackensack (Lovegreen 1974). These deposits included fine- to medium-grained sand, silt, and clay that were locally reworked by fluvial processes and redeposited on outwash plains. After the morainal dams were breached, the lakebed sediments were exposed to erosion, desiccation, and invasion by vegetation. Lacustrine deposits were limited to smaller isolated basins. The lakebed sediments were covered by peat and dark-colored silty/clayey marsh deposits with a soil horizon, indicating the presence of an open boreal forest (Averill et al. 1980). With the establishment of the modern southward-flowing drainage, the lacustrine and marsh deposits were partially eroded, and the Hackensack and Passaic rivers started their depositional history. These rivers deposited thin layers of sediment across much of the floodplain area until human intervention and urban development diverted the courses and changed the flow characteristics of the streams.

3.4.2 Site-Specific Geology

Soil borings for radiological characterization were drilled at selected locations across MISS, Stepan, Sears, and the vicinity properties in Maywood and Lodi. Most of the borings drilled for radiological sampling extended to depths of 1.8 to 3.7 m (6 to 12 ft). On the Maywood properties, several deep borings [9 to 18 m (30 to 60 ft)] were drilled into the underlying bedrock to gather geologic data and install groundwater monitoring wells. These borings provide information about the upper portion of the sandstone bedrock formation to a maximum drilled depth of approximately 18 m (60 ft). The sediments underlying the Maywood and Lodi properties are divided into two stratigraphic units: a bedrock unit composed of interbedded, well-cemented sandstone and siltstone of Triassic/Jurassic age (Passaic Formation), and an overlying section of unconsolidated clastic materials of Pliocene-Pleistocene age. These units are separated by an erosional unconformity. The surface of the bedrock unit was extensively

eroded by both glacial and fluvial processes, and the unconsolidated sediments overlying the bedrock surface are composed of clastic materials deposited by these processes. The sedimentary section was originally capped with a well-developed deciduous forest soil (Merrimac soil) (Tedrow 1986). Extensive agricultural and later urban development disturbed or destroyed much of the original soil profile. Most of the soil cover in the local area is now classified as urban fill.

Bedrock

Bedrock in the local area consists of alternating beds of dark reddish-brown sandstone and siltstone of the Passaic Formation (refer to the geologic log for DeSaussure property boring B38W12B in Appendix J). The upper portion of the Passaic Formation, as described in this log, is representative of the section throughout the Maywood and Lodi areas. The Passaic Formation is composed of three identifiable units in this boring. The uppermost unit is a gray to red silica- and calcite-cemented quartz sandstone, moderately to highly weathered, having joints and bedding planes oriented horizontally with minor iron and calcite filling. This sandstone unit is widely distributed throughout the local area and is commonly encountered in the bottom of the soil and geologic borings. Underlying this unit is a finer-grained siltstone unit, also gray to red in color but exhibiting more extensive fracturing, jointing, and weathering. Joints and fractures are generally horizontal with minor to complete filling by secondary calcite cement. The lowest unit encountered in this boring is composed of coarse-grained sands with minor amounts of conglomeratic materials. This lower unit is also described as gray to red calcite- and silica-cemented sandstone. Joint and fracture surfaces are generally horizontal, moderately weathered, and coated with crystalline calcite and mud.

The Passaic Formation is exposed as ridges along Interstate 80 and Route 17 in the local area. The surface of the bedrock unit has been encountered at depths from 15 cm (6 in.), on the northern

portion of the Stepan parking lot in Maywood, to approximately 9 m (30 ft) on the Kennedy Park property in Lodi. The configuration of the bedrock surface developed as the result of erosional processes, which formed elongated northeast- to southwest-trending narrow ridges and broad valleys. Erosional valleys were originally formed as the result of fluvial processes during the late Mesozoic and early Tertiary. These valleys probably formed along existing zones of weakness that correspond to the primary fracture trends.

The erosional bedrock surface directly influenced the distribution of the overlying unconsolidated sediments and, to a lesser degree, is still expressed in the present surface topography. This surface controlled the courses of streams carrying sediments and thereby affected the distribution of fine-grained silts and clays (overbank and interfluvial sediments) and coarse sands and gravels (stream deposits). Maps showing the elevation contours on the top of the bedrock surface in the Lodi area (south of Essex Street) are presented in Figure 3-9, and in the Maywood area in Figure 3-10.

Bedrock surface in the Lodi area

The bedrock surface in Lodi has controlled the distribution of unconsolidated sediments and continues to influence the location of surface runoff and groundwater flow. (In the following discussion of the Lodi area, directional references refer to state plane coordinates. The site grid is located 90°+ west, making reference to this grid system confusing.)

The course of Lodi Brook corresponds to a broad erosional low in the bedrock surface. This elongated low area (shown in Figure 3-9) is bounded to the east and west by well-defined bedrock highs that underlie the topographic ridges. The crest of the western ridge is approximately 300 m (1,000 ft) from the axis of the erosional low and reaches a maximum elevation of 24 m (80 ft) above MSL (shown as "A" in Figure 3-9). Residual high areas to the east, underlain by Passaic sandstone, form a discontinuous northeasterly trending ridge that defines the eastern boundary of

the Lodi Brook drainage basin. Smaller residual knobs of resistant sandstone are scattered throughout the bedrock low and have a direct effect on the characteristics of Lodi Brook.

Closed low areas and isolated high-standing erosional remnants have been mapped on the bedrock surface. Differential compaction of the unconsolidated sediments over this bedrock relief results in broad low areas in the present surface topography. Small isolated low areas in the bedrock surface correspond to areas where standing water frequently occurs on the surface. Bedrock low areas underlie Lodi Municipal Park, the Flint Ink property, and Kennedy Park (designated as "B," "C," and "D," respectively, in Figure 3-9). These areas are frequently wet and marshy during heavy rains. The course of Lodi Brook is poorly defined and tends to bifurcate into more than one channel in these areas. The significance of these stream characteristics is that overbank sediments become spread over an area significantly wider than the stream channel. These are areas where sediments contaminated with radioactive waste are most likely to be deposited. The distribution of contaminated soils in the Lodi area observed in the field corresponds to the characteristics of stream deposition. The distribution of contaminated materials is discussed in detail in Section 4.0.

Bedrock surface in the Maywood area

The general characteristics of the bedrock surface at Maywood are the same as in the Lodi area. Erosional processes have affected the bedrock surface, creating closed low areas, small isolated knobs, and large residual high-standing features.

Directions in the following discussion refer to site grid north. The site grid is rotated 40°E of state plane north. The configuration of the bedrock surface in the Maywood area is shown on the elevation contour map (Figure 3-10). This map uses data from all boreholes, wells, and sampling locations drilled in the area during all phases of the investigation. Cross sections for the Maywood area are included, showing stratigraphic relationships. Cross section locations are shown in Figure 3-11; the cross

sections are included as Figures 3-12 through 3-16. Borehole logs are included in the site characterization reports for each property.

Bedrock is very near the surface along the northern boundary of the Maywood study area (shown as "A" in Figure 3-10). In the Stepan parking lot (north-central area along the New York, Susquehanna, and Western Railroad), bedrock is within 15 cm (6 in.) of the surface. This bedrock high extends to the east and southeast across the Myron property along Maywood Avenue (shown as "B" in Figure 3-10). Two prominent highs extend south and west-southwest from this high point in the Stepan parking lot (shown as "C" and "D" in Figure 3-10). The southwesterly oriented ridge connects across a saddle to the pronounced topographic ridge west of Lodi Brook. This saddle in the bedrock relief is expressed in the present surface topography and corresponds to a surface water divide.

Two low areas in the bedrock surface extend across the Sears property south of the Maywood site (shown as "E" in Figure 3-10). The eastern bedrock low underlies the area where standing water and marshy conditions exist on the eastern end of the Sears property. The northern end of Lodi Brook originates in this area as two separate channels that carry surface runoff south into the main channel of Lodi Brook at a confluence point on the National Community Bank (NCB) property south of Route 17. A well-developed bedrock low in the south-central area of the Stepan property extends south across the Stepan and Sears properties and apparently influences flow in the western tributary of Lodi Brook.

The bedrock surface slopes toward the west under the far western and southwestern portions of MISS (shown as "F" in Figure 3-10). This bedrock low originally controlled the former channel of Westerly Brook before it was diverted through man-made conduits. Sharp downcut channels in the bedrock surface are present in this area.

The structural lows in the bedrocks surface have preferential northwest and northeast alignments. These trends probably reflect fracture set orientations in the bedrock. Erosion was apparently more extensive along these trends and resulted in well-defined linear relationships; these alignments are highlighted in Figure 3-10. These erosional lows directly affected the distribution of sediments in the overlying sections by controlling the locations of streams in the area, and the resultant distribution of porous sediments in the bedrock lows directly affects groundwater flow in the local area.

Bedrock in the study area is the primary controlling surface influencing deposition, drainage, and subsurface flow. The configuration of this erosional surface has influenced the distribution of sediments in the unconsolidated section overlying bedrock and continues to control the location, character, and morphology of the present surface drainage.

Unconsolidated sediments

The unconsolidated surficial sediments in the study area were deposited by fluvial and glacial processes. As described above, erosional lows downcut into the bedrock surface controlled the location of fluvial channels that transported and deposited clastic sediments through the area.

In the lower portion of geologic borings drilled in the bedrock lows, sands and gravels derived from bedrock were encountered immediately above the weathered surface. The gravels were commonly composed of rounded to subrounded pebbles of Passaic Formation sandstone, indicating local fluvial (stream) transport and reworking. Gravel-sized fragments of igneous and metamorphic materials and boulder-sized erratics of sedimentary materials were observed in these deposits (borehole B38W7B on the Stepan property and B38G19-28 series on MISS), indicating glacial transport into the local area. As described in Section 3.4.1, materials of direct glacial origin overlie bedrock in many parts of the region (Cole et al. 1981). In the lower portion of the channels, much of the

material deposited on the bedrock surface cannot be easily distinguished from the weathered bedrock materials (e.g., boreholes R389 at 9 Hancock St., R404 at NCB, and R537 at Sears). In such cases, the deposits are grouped with the weathered bedrock.

Unconsolidated materials that overlie the weathered bedrock consist primarily of sands, silts, and clays. The composition and characteristics of these deposits vary widely according to depositional history. These deposits can be divided into three units that interfinger with the underlying and overlying unit. These are identified as a lower unit of more stratified, better-sorted, fine-grained sands and silts; a middle unit of clayey silts and sands, with varying amounts of organic materials; and an upper unit of poorly stratified sands, silts, and gravels that are, in part, disturbed by agricultural and urban development. Some interfingering occurs between the units and, generally, contacts are poorly defined.

The lower unit is composed primarily of light brown to dark yellowish-orange layers of fine-grained sands and silts that are moderately well sorted to well sorted (e.g., boreholes R374 at 113 Ave E and R540 at Sears). These materials are stratified, indicating deposition by glacial meltwater and/or streams into a lacustrine environment and/or on low-lying plains associated with Lake Hackensack. Channel deposits with coarse gravels and sands cut into and through the fine-grained materials.

The middle unit consists of grayish-olive to greenish-gray/grayish-green layers of clayey silt and silty clay with clayey to clean sand. These sediments are capped in places by a well-developed soil horizon with abundant organic material (e.g., borehole C628 at Sears) or channel deposits composed of black to grayish-black clays and silts, which in places contain varying amounts of sand, gravel, and man-made debris (e.g., boreholes R418 at I-80, R577 at NCB, and R566 at Sears). The soil horizon was best seen within borings at the northern and western corners of the Sears property (e.g., boreholes R544 and R552).

The middle unit was probably deposited during the later stages of Lake Hackensack's transition to a subaerial environment. The

deposits form much of the subsurface profile for the Lodi Brook channel, which flows through Maywood and Lodi. Sediments within the Lodi Brook channel are characterized by gravelly silts and sands from mixed sources.

The upper unit consists of undifferentiated deposits of sand, silt, and gravel that overlie the middle unit. These sediments are differing shades of browns, grays, and reds (e.g., boreholes R398 at NCB/I-80 and R580 at NCB) with widely varying compositions. The deposits are poorly to moderately sorted, indicating limited reworking. The sediments are probably associated with the recent flood deposits from local drainage within the Saddle River Basin. The sediments are disturbed in places, and some layers contain man-made debris that has been reworked and deposited in the local streambeds (e.g., borehole R535 at NCB). Varying amounts of nonengineered fill derived from local sandstone and/or man-made and imported material are mixed with and overlie this unit. Much of the material in this unit was placed or reworked during the urban development of the area and rechanneling of Lodi Brook.

Distribution of Lodi Brook sediments

Historic aerial photographs and topographic maps were reviewed to determine the former course of Lodi Brook. This surface drainage feature carried contaminated sediments offsite and southward through the town of Lodi. The identification and definition of the extent of the brook sediments were an important part of the RI work.

Before much of the urban development in the Maywood/Lodi area, Lodi Brook flowed from a marshy area south of the present Stepan property toward the south across relatively flat, open topography.

However, since the area was developed, the natural course of the brook has been straightened, channeled, covered, and diverted from much of its original course. In Lodi, community developments now cover most of the former brook channel. This former channel carried the wastewater discharge from MCW and deposited contaminated material along its course. These contaminated

deposits within the channel are often recognized by a dark gray to black silt/clay layer with varying amounts of gravel and man-made debris overlying a greenish-gray to grayish-green clayey sand or silty clay layer and are generally included in the upper stratigraphic unit described above. The layer is buried from 0.6 to 3 m (2 to 10 ft) below surface. (For a detailed analysis of nature and extent of contamination, refer to Section 4.0.)

During the current investigation, the northernmost Lodi Brook sediments were encountered on the Sears property at 200 Route 17. North of this property, on the north side of Route 17, the sediments were more distributed, and a definitive stream channel characteristic was not evident. Stream channel sediments occur in a relatively wide area near the present Lodi Brook channel south of Route 17 and continue south in a narrow band toward the NCB property at 113 Essex Street. Diagrammatic cross-sections for the Lodi area (general location shown in Figure 3-17) show the distribution of channel and contaminated sediment deposits (Figures 3-18 through 3-20). Channel deposits continue to be observed southward to the northeastern corner of the present NCB building, where the channel merges with another tributary of Lodi Brook that flows from the area immediately northeast of the Essex Street/Route 17 intersection. Much of the sediment in the area where the two channels meet appears to have been removed by excavation in sand borrows and/or disturbed by subsequent rechanneling of Lodi Brook along the current underground drainage easement. These two channels initially may have paralleled each other, later combining into a braided pattern for a short distance. Two contaminated channel deposits (boreholes R624 and R518) are present under the front lawn of the bank property.

The former channel below the tributary junction continues southward under Essex Street and the NCB parking area. It is again encountered north of Interstate 80, near Exit 63, and west of an open section of the present Lodi Brook. (Refer to Cross Section No. 1, Figure 3-18.) The main channel is approximately 3 to 6.1 m (10 to 20 ft) wide; however, some overflow deposits appear to be present. Most of the uppermost channel sediments are missing along

the border of Interstate 80 and may have been excavated during freeway construction.

Within Lodi, south of Interstate 80, sediments in the former main channel were encountered under 62 Trudy Drive. Thinner layers of sediment characteristic of the contaminated channel deposits were also found at 19 Redstone Lane and 9 Hancock Street. (Refer to Cross Section No. 2, Figure 3-19.) However, the limited thickness of these layers indicates that they are probably side channel and/or overflow deposits. From 62 Trudy Drive, the former channel appears to flow southward parallel to and slightly east of Hancock Street. On properties west of Hancock Street and south of Trudy Drive, main channel sediments were not encountered. However, a thin layer similar to the channel deposits was present on the corner property at 113 Avenue E, indicating that the main channel south of Trudy Drive was probably near or directly under Hancock Street, just north of its present intersection with Avenue E.

South of Trudy Drive, the course of Lodi Brook becomes poorly defined. A broad, low area frequently covered by standing water is located in the vicinity of the Flint Ink property and extends southward across the Vehicle Inspection Station property. In this area, the main channel of Lodi Brook splits into two channels, and overbank stream sediments are widely deposited over the surface. Contaminated sediments associated with these overbank deposits are also distributed over an area larger than the width of the stream channel. (Refer to Cross Section No. 3, Figure 3-20; see Section 4.2 for a description of the extent of contaminated soils in the Lodi Vicinity Properties.)

Map preparation

Elevation-of-bedrock surface maps were prepared to assist in interpreting and evaluating geologic and hydrogeologic data. The maps of the Lodi area were prepared using a gridding and contouring computer program package called Surfer (© Golden Software, Inc.). The irregularly spaced borehole data were converted to a regularly spaced grid of values using "kriging," which is a geostatistical

technique that uses the regional variable theory to generate a regularly spaced grid. An octant search method was used to force the gridding program to consider all neighboring data points in the grid interpolation. After the grid was prepared, it was smoothed to reduce the angularity of the contours. Smoothing was accomplished using a cubic spline algorithm, which expands the grid and interpolates smoothed data between the existing grid nodes.

To supplement the borehole data, depth-to-bedrock and thickness estimates were derived from regional bedrock slope and proximity borehole data and topographic maps. These estimates were used to provide control in areas of sparse data. In the Maywood area, data density and spatial distribution were adequate to generate the bedrock maps, and no additional data points were generated.

3.5 HYDROGEOLOGY

3.5.1 Regional Hydrogeology

The primary groundwater aquifer in the MISS area is the Brunswick Formation; groundwater in this formation occurs primarily in a network of interconnected joints and fractures. The intervening unfractured rock has negligible capacity to store and transmit groundwater and, as depth increases, the fractures and joints decrease in size and number. In some areas, the top portion of bedrock is highly weathered and contributes to groundwater flow. Drilling logs indicate little potential for locating a water-producing zone below 122 m (400 ft).

The groundwater system consists of a series of alternating tabular aquifers and aquitards several tens of feet thick. The water-bearing fractures of each tabular aquifer are more or less continuous, but hydraulic connection between individual tabular aquifers is poor (Carswell 1976). These tabular aquifers generally dip downward for a few hundred feet and are continuous along strike for thousands of feet.

Virtually all groundwater in the Brunswick Formation occurs in interconnecting fractures and joints (Vecchioli and Miller 1973).

Additional void space occurs in the sandstone and conglomerate beds where cementing material is lacking, either because it was never deposited or because it has been dissolved and removed by circulating groundwater (Vecchioli and Miller 1973). The most important fractures with respect to transmitting groundwater are generally vertical joints. Observations made at numerous places throughout the outcrop areas of the Brunswick Formation in New Jersey indicate that one set of vertical joints roughly parallels the strike of the rocks, and a second set is generally perpendicular to the strike.

Preferential flow in the direction parallel to strike has been documented by several investigators. Pumping test data reported by Herpers and Barksdale (1951) showed nonradial drawdown, with drawdown along strike and no distinct drawdown transverse to strike. Pumping test data reported by Vecchioli (1967) and Vecchioli et al. (1969) indicate that the direction of highest permeability and greatest movement of water in response to pumping characteristically parallels the strike of the beds. In most of the Hackensack River Basin and Bergen County, the Brunswick Formation yields only small to moderate supplies (less than 500 gpm) of groundwater to wells (Carswell 1976).

Glacial deposits are a source of groundwater for public and industrial use in several areas, including parts of Passaic and Morris counties and the area along the Ramapo River in western Bergen County (Gill and Vecchioli 1965). The glacial till has low permeability and low groundwater yield and is generally developed only for domestic purposes. The stratified glacial deposits in the area generally have higher permeabilities than the till and frequently yield usable quantities of water. Due to the discontinuous nature of most of the aquifers in the area, there appears to be no well-developed, regional groundwater flow system except for flow through the glacial deposits that underlie many of the rivers in the area.

3.5.2 Site Hydrogeology

This section presents an interpretation of the hydrogeology of MISS and its immediate vicinity based on information obtained from published reports, DOE's environmental monitoring program, previous investigations, and data gathered during the RI. The locations of hydrogeologic data collection points are shown in Figure 3-11. Directional references in this section are site grid north; the site grid is rotated 40°E of state plane north.

Groundwater occurrence

The shallow groundwater flow system at MISS is in the unconsolidated sediments and the shallow Passaic Formation bedrock and occurs under unconfined, water table, and partially confined conditions. No major confining layers have been identified, and saturation is continuous from the water table surface to at least the maximum depth of investigation [18 m (60 ft) below ground surface (BGS)] in the bedrock. Groundwater in the shallow bedrock generally reflects water table conditions toward the northeastern portions of the site and partially confined conditions toward the west and southwest. The variability of fracturing and weathering of the bedrock results in differences in permeabilities between different zones in the bedrock. The water-bearing fractures at different depths below ground surface contain groundwater under different hydraulic heads; this condition creates potentiometric head differences between the unconsolidated sediments unit and the bedrock.

Depth-to-water is shallow and ranges from approximately 0.6 to 4.6 m (2 to 15 ft) BGS; water level elevations range from 12 to 16.5 m (39 to 54 ft) above MSL. Saturated thickness in the unconsolidated sediments ranges from 1.5 to 4.6 m (5 to 15 ft), generally decreasing to the east, where the sediments thin onto a bedrock high on the Stepan property. The saturated thickness is approximately 15 ft in the vicinity of B38W14S (Ballod property). Saturated thickness is variable across MISS, ranging from approximately 5 ft at B38W19S and 6 ft at B38W18D to 15 ft at MISS-2A.

The potentiometric level in the bedrock ranges from 12 to 20 m (40 to 66 ft) above MSL. Results of water level measurements over the past several years have shown that seasonal fluctuations typically range from 0.46 to 1.8 m (1.5 to 6 ft) during a year. Selected hydrographs showing groundwater levels measured in the unconsolidated sediments and bedrock from January 1989 through August 1992 are presented in Figures 3-21 and 3-22. The hydrographs reflect typical seasonal fluctuations.

Water levels fluctuate in response to short- and long-term seasonal changes in precipitation and evapotranspiration. Water levels are generally lowest from May through September, rise during late November and December, and peak in February and March.

Water level elevation maps for September 4, 1991, and March 30, 1992, presented in Figures 3-23 through 3-26, reflect seasonal low and high groundwater level conditions. Water levels on these dates do not reflect historical minimum or maximum water level elevations; rather, these dates were selected to include water level data from all wells. Well pair B38W19 was included in the program during May 1991. Average hydraulic gradients are generally low and indicate groundwater flow to the west and southwest toward the Saddle River where groundwater is discharged. Overall average hydraulic gradients are slightly steeper during high groundwater conditions than during low groundwater conditions. The water table and potentiometric maps also reflect the line of bedrock highs to the east (crossing Stepan property) that forms a local groundwater divide.

Groundwater recharge and discharge

Groundwater recharge is principally from percolation of precipitation, which is estimated to be approximately 30 percent of the annual precipitation at MISS. Recharge areas coincide with topographically high areas, while discharge areas are in low areas and along drainages. Hydraulic head differences observed in well pairs generally confirm this. In recharge areas, the shallow well of the pair shows a higher potentiometric head than the deeper

well, indicating downward components of flow (e.g., MISS-2A and MISS-2B). In discharge areas, potentiometric heads observed in the deep well of the pair exceed that of the shallow well, indicating an upward vertical flow component (e.g., B38W14S and B38W14D).

Aquifer hydraulic properties

Field hydraulic conductivity tests were performed in the overburden materials and the bedrock. Estimates of horizontal hydraulic conductivity of the overburden materials were obtained from falling head and recovery tests in completed wells. Vertical hydraulic conductivity values for the overburden material were calculated from falling head tests using open-end casing in boreholes. Hydraulic conductivity tests in the bedrock consisted of constant head pressure tests (packer), constant head gravity, falling head, and recovery tests. The packer tests were generally conducted at 3.5-m (11.5-ft) intervals in the MISS well series and at intervals ranging from 1.5 to 4.6 m (5 to 21.5 ft) in the B38W well series. In addition to the packer tests, the MISS wells were tested by constant head gravity and recovery tests (three wells), falling head and recovery tests (one well), and recovery tests (one well). These tests were conducted after the wells were completed and included the entire open or screened interval. The packer tests were generally performed to estimate the hydraulic conductivity for discrete zones, and the constant head gravity, falling head, and recovery tests were performed to estimate the average hydraulic conductivity over the entire screened or open interval and to evaluate monitoring well performance. The conductivity test results are summarized in Table 3-2. A summary of the test interpretation methods is presented in Table 3-3.

Passaic Formation. Movement of groundwater through the Passaic Formation is through the weathered section of the formation and through secondary fractures in the bedrock. Hydraulic conductivity tests were performed in the upper 9 m (30 ft) of the bedrock. The hydraulic conductivity results for the bedrock from eight locations ranged from 2.2×10^{-5} to 4.0×10^{-3} cm/s, with an overall

geometric mean of 7.4×10^{-4} cm/s.

Average test results for the open interval in the shallow bedrock on the west/southwest portion of the site (locations MISS-1B, -7B, -5B, and -4B and B38W19D) ranged from 9.9×10^{-4} to 2.4×10^{-3} cm/s. Average test results for the open interval at locations upgradient (MISS-2B and -3B and B38W18D) were one-half to one order of magnitude lower, ranging from 9.7×10^{-5} to 4.7×10^{-4} cm/s.

Test results from MISS-2B, -3B, -4B, -5B, and -7B and B38W19D indicated higher hydraulic conductivities (approximately 1×10^{-3} cm/sec) in a bedrock zone generally between 4.6 and 9.1 m (15 and 30 ft) above MSL. Discrete interval tests from B38W19D and MISS-5B showed results of 2.6×10^{-3} and 1×10^{-3} cm/s, respectively. These results are consistent with drilling logs, which indicate loss of fluid circulation in fracture zones between approximately 8.8 and 9.5 m (29 and 31 ft) BGS or 7.9 and 8.5 m (26 and 28 ft) above MSL.

Unconsolidated sediments. Five hydraulic conductivity tests were conducted in the saturated unconsolidated sediments. The hydraulic conductivity values range over three orders of magnitude from 2.6×10^{-5} to 2.9×10^{-2} cm/s, and the geometric mean is 3.9×10^{-4} cm/s. The wide variation in values is the result of the heterogeneity of the materials that compose the overburden at the site. Descriptions of material from boreholes drilled in the unconsolidated materials indicate textural varieties including coarse-grained fill material (slag, bricks, rubble), fine-grained fill material (sludge and ash), gravel, sand, and silt deposits. These descriptions indicate that the hydrogeologic properties of the overburden are both heterogeneous and anisotropic.

Falling head permeability tests were conducted at 10 locations to estimate the vertical hydraulic conductivity in the unconsolidated sediments. Results ranged from 5.3×10^{-6} to 2.2×10^{-3} cm/s, with a geometric mean of 7.7×10^{-5} cm/s.

Groundwater flow

Groundwater flow in the unconsolidated sediments occurs through primary porosity and is largely gradient dominated. Conversely, due to lack of significant primary (matrix) porosity, groundwater in the competent bedrock is principally along fractures.

The generalized conceptual flow schematic (shown in Figure 3-27) illustrates the recharge/discharge relations observed at MISS. The diagram is oriented southwest to northeast across the site. A local groundwater divide is present to the northeast, and groundwater flows to the southwest toward the Saddle River. Recharge to the overburden occurs throughout the site. Through the middle section of the site, a downward vertical flow component exists from the overburden to the bedrock. Recharge to the bedrock occurs at the groundwater divide and from the overburden. To the southwest, the vertical component reverses, with an upward hydraulic gradient from the bedrock to the overburden.

The predominant direction of flow of the groundwater system in the shallow unconsolidated sediment/bedrock is southwest toward the Saddle River. The hydraulic gradients in the bedrock and unconsolidated sediments are generally low. The water table and potentiometric (bedrock) surface, flow directions, and gradients in various parts of the system are described below.

The shape of the water table surface in the unconsolidated sediments reflects the configuration of the top of the bedrock. In the vicinity of well pair B38W19, water levels show a marked decrease relative to the surrounding area. This depression is reflected in both the water table and the bedrock potentiometric surface (where it is more subdued). Historic data indicate that hydraulic gradients in this area may have been greater than those determined for September 1991 and March 1992; however, these data represent typical conditions.

Groundwater flow in the vicinity of B38W19 appears to be affected by a combination of local structural and geologic conditions. These include fractured bedrock, the configuration of the erosional top of bedrock, and the distribution of porous

sediments. Generalized hydrogeologic conditions are shown in Cross Sections A-A', B-B', C-C', D-D', and E-E' (Figures 3-12 through 3-16).

As discussed earlier, the structural lows in the bedrock probably reflect fracture set orientations in the bedrock. As shown in Figure 3-10, two linear trending bedrock lows intersect in the vicinity of B38W19. Drilling records indicate that shallow bedrock is highly fractured in this area; reported fracture sets include a set at or near the top of bedrock 5.2 to 7 m (17 to 23 ft) BGS and another, more significant set at approximately 9 m (30 ft) BGS. Drilling records indicate loss of fluid circulation in the set of fractures at 9 m (30 ft) at locations B38W19D and MISS-5B. Hydraulic conductivity test results from this zone range from 1.3×10^{-3} cm/sec to 2.6×10^{-3} cm/sec.

The erosional lows in the bedrock directly affected the distribution of the overlying sediments by controlling the locations of streams in the area. A dominant low, shown in Figure 3.10, trends from the northwest (east of MISS-1) to the southeast (B38W-07B). This feature was the primary factor controlling sediment deposition across MISS. As evidenced by the black silty organic sands, silts, and clays overlying the weathered bedrock (Figures 3-12 through 3-16), most of MISS was once a low-lying swampy area. Gravelly sand and sandy gravels are present in sharp downcut scours in the bedrock, as evidenced in boreholes B38W-7B and B38G 21 and 25 through 28. The extent of this unit has not been completely defined.

The shape of the contours reflects the bedrock low and the changes in hydraulic conductivity of the materials in the bedrock low. The lower potentiometric levels in the bedrock in this area reflect the higher conductivity of the bedrock due to its fracture density. As a result of this combination of conditions, the hydraulic gradient steepens locally, creating preferential flow paths (Figures 3-23 and 3-25).

West of B38W19, the erosional top of the bedrock drops from 12.8 m (40 ft) above MSL at B38W19D to 7.7 m (24 ft) above MSL at B38W14D.

The hydraulic gradients in the bedrock and unconsolidated sediments are generally low; the average hydraulic gradient in the unconsolidated sediments is 0.01. As shown in Figures 3-23 and 3-25, the gradient steepens in the vicinity of B38W19S and B38W07B and flattens to the southwest toward B38W14S. The horizontal gradients do not appear to vary significantly with seasonal groundwater fluctuations.

As shown in Figure 3-26, the hydraulic gradient in the bedrock is steepest (approximately 0.02) in the eastern portion of the site and approximately 0.01 through the middle section of the site; it decreases to approximately 0.004 west of Route 17. These gradients reflect slope changes of the potentiometric surface resulting from changes in the physical characteristics of the bedrock. The gradients are consistent with the descriptions of the physical characteristics of the bedrock from core samples, the observed configuration of the top of the bedrock, hydraulic conductivity test results, and observed potentiometric levels.

To provide an estimate of groundwater flow rates in the unconsolidated sediments and bedrock at MISS, average linear groundwater velocities (or seepage velocities) were calculated with the following equation:

$$\text{velocity} = \frac{\text{hydraulic conductivity} \times \text{hydraulic gradient}}{\text{porosity}}.$$

An assumed total porosity of 0.20 was used for the unconsolidated sediments, and an effective porosity range of 0.01 to 0.05 was used for the bedrock. Geometric mean hydraulic conductivities for the unconsolidated sediments and bedrock were used, and average hydraulic gradients were determined from the March 1992 water level elevation maps (Figures 3-25 and 3-26).

Using an average gradient of 0.011, a geometric mean hydraulic conductivity of 7.4×10^{-4} cm/s, and an effective porosity of 0.01 to 0.05, the average linear velocity in the bedrock ranges from 257 to 51 m/yr (842 to 168 ft/yr).

Flow in the bedrock may actually be faster or slower than the

calculated velocity because of

- fracture system varying with flow path,
- seasonal variations in hydraulic gradient, and
- variable effects of the vertical hydraulic gradient.

Assuming a total porosity of 0.20, an average gradient of 0.01, and a hydraulic conductivity of 3.9×10^{-4} cm/s, the average linear seepage velocity in the overburden is estimated to be 6.1 m/yr (20 ft/yr).

3.6 DEMOGRAPHY AND LAND USE

3.6.1 Land Use and Population

As illustrated in Figure 1-9, land use in the vicinity of MISS is residential, commercial, and industrial. The site is bordered by a railroad line to the northeast, commercial and industrial property to the south and east, and Route 17 to the west.

The nearest residential area is approximately 46 m (150 ft) northeast of MISS; the residences are a mixture of multiple- and single-family dwellings.

According to the 1990 Census, the populations of the Maywood and Lodi boroughs were 9,473 and 22,355, respectively; the population of Rochelle Park Township was 5,587. The 1989 population of Bergen County was 825,380, reflecting an average annual decrease of 0.3 percent between 1980 and 1989 (U.S. Bureau of the Census 1991). The total population of the area within an 80-km (50-mi) radius of MISS is over 10 million. There is no human access to MISS for recreational, hunting, fishing, or residential activities.

3.6.2 Drinking Water Sources

Surface water

The quality of surface water in the Saddle River Basin is considered too poor for use as a municipal water supply. In 1990, the average hardness in the Saddle River was greater than 160 $\mu\text{g/L}$ as CaCO_3 (USGS 1991), which is considered very hard; the water would require extensive treatment for use as potable water. The major supply of water in the Maywood area is surface water from the Hackensack River Basin.

One surface water intake exists in the Saddle River Basin at Arcola, New Jersey, approximately 4 km (2.5 mi) upstream from MISS. No water intakes exist downstream from MISS.

Groundwater

Groundwater in the Maywood area occurs in both the Brunswick Formation and the overlying unconsolidated glacial deposits. Wells completed in the Brunswick yield from 1.3 to 47 L/s (20 to 500 gpm). The water is moderately mineralized and moderately hard to very hard.

The unconsolidated glacial deposits provide a more variable source of groundwater. Small yields [0.13 L/s (2 gpm)] are available from unstratified till deposits; stratified stream and lake deposits yield as much as 57 L/s (900 gpm). Water quality from these deposits is highly variable, depending on location and sediment source; it ranges from soft to hard but is generally not mineralized.

A records search was conducted through NJDEP, and 74 water wells drilled between 1954 and 1982 were identified within a 4.8-km (3-mi) radius of MISS (Table 3-4). Depths range from 18 to 201 m (60 to 660 ft) with reported yields of 38 to 1324 L/min (10 to 350 gpm). The number and reported uses of the wells are 35 for domestic use, 14 for industrial use, 9 for irrigation, and 1 for public supply. No information was available for the remaining 15 wells. The public supply well, drilled in 1980 by the Saddle Brook Board of Education to supply water for the Smith Elementary School, reaches a depth of 61 m (200 ft) and reportedly produces

127 L/min (33.5 gpm). Smith Elementary School is currently served by the municipal water system, and the well is not in use.

Thirty-two of the wells identified are located within approximately 1.6 km (1 mi) of the site. The well locations, plotted using the state rectangular coordinate grid system, are shown in Figure 3-28. These include 14 wells for domestic use, 13 for industrial use, and 2 for irrigation. No information was available for the remaining three wells.

Groundwater is generally not used for municipal water supply in the lower Saddle River Basin. Some water is pumped from a well field south of MISS during periods of drought or high public demand. The main source of water supply in the Maywood area is surface water in the Hackensack River Basin.

3.7 ECOLOGY

The Maywood Site is located within the glaciated portion of the Appalachian Oak Forest Section of the Eastern Deciduous Forest Province (Bailey 1978). However, past agricultural and urban development has altered the forest habitat in the area. Prior to recent removal actions on the Ballod property and MISS, these areas supported an early successional community dominated by grasses and forbs with scattered shrubs and trees (e.g., aspen and elm). The residential properties contain plant species common to landscaped yards, such as grasses (fescue and blue grass), garden vegetables, flowers, evergreen shrubs, and trees (ANL 1984).

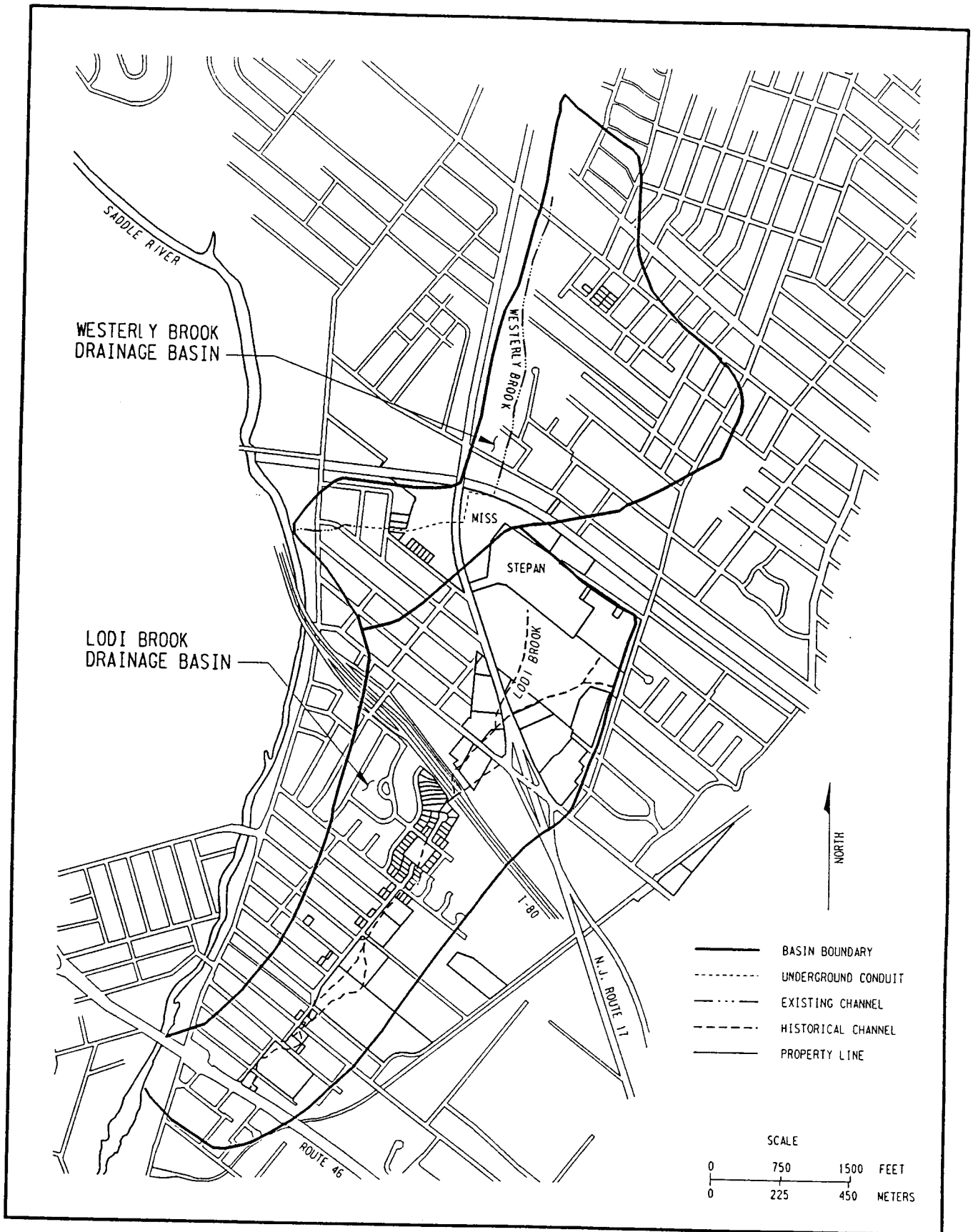
Commonly occurring animal species are those adapted to suburban and urban environments. Bird species include house sparrow, red-winged blackbird, common crow, common grackle, starling, mourning dove, robin, and wood thrush. Mammalian species include Norway rat, house mouse, meadow vole, raccoon, eastern cottontail rabbit, opossum, and eastern gray squirrel. Woodchuck burrows were observed at MISS prior to recent remedial action activities. A small number of reptile and amphibian species (e.g., eastern garter snake and American toad) probably inhabit the area (ANL 1984).

Aquatic habitats are limited to drainageways, small temporary ponds, Westerly and Lodi brooks, and the Saddle River. Westerly Brook traverses MISS but does not actually constitute an aquatic habitat because it is encased in concrete pipe beneath the site. Similarly, much of Lodi Brook has been incorporated into a subsurface storm drain system. However, surface-feeding ducks (e.g., mallard, black duck) are commonly observed on the Saddle River and accessible portions of Westerly Brook. Mosquito larvae, beetles, bugs, snails, isopods, midges, aquatic worms, and other invertebrates typically occur in these habitats and in stream and temporary pond habitats (ANL 1987).

An ecological survey conducted in August 1992 focused on documentation of terrestrial and aquatic habitats. The survey confirms earlier findings that common organisms in the terrestrial habitat near the site include groundhogs, raccoons, robins, and mourning doves, and in aquatic habitats common organisms are bass, carp, geese, and ducks. Habitats occurring on MISS and its vicinity properties represent a minimal ecological resource due to their urbanization. Therefore, organisms on these properties would not necessarily warrant body-burden analyses for possible impacts on biota from site contaminants. The river corridor, however, is a largely undeveloped habitat that supports a more diverse biotic environment, although it is surrounded by urbanization and human populations. The Maywood area does not appear to support any unique, unusual, or critical habitats for continued propagation of key indicator species in the ecosystem. The Maywood Site properties are not highly valued as an economic, recreational, or aesthetic resource on the basis of habitat characteristics.

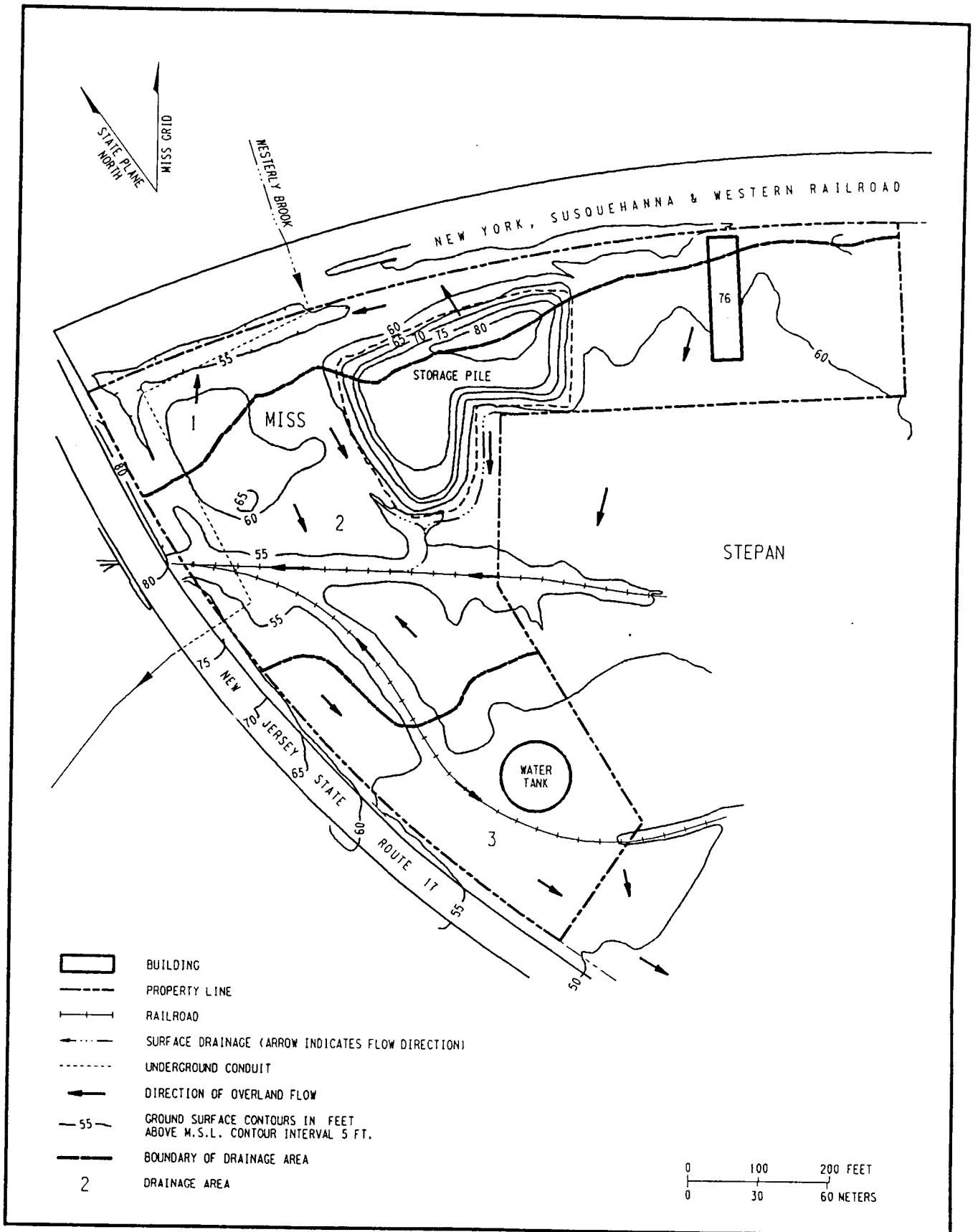
No threatened or endangered species have been identified at the Maywood Site (Chezik 1989).

FIGURES FOR SECTION 3.0



138 R01F044.DGN F1

Figure 3-1
 Drainage Basins in the Maywood and Lodi Areas



138 ROIF018.DGN F2

Figure 3-2
MISS Drainage Areas and Direction of Overland Flow

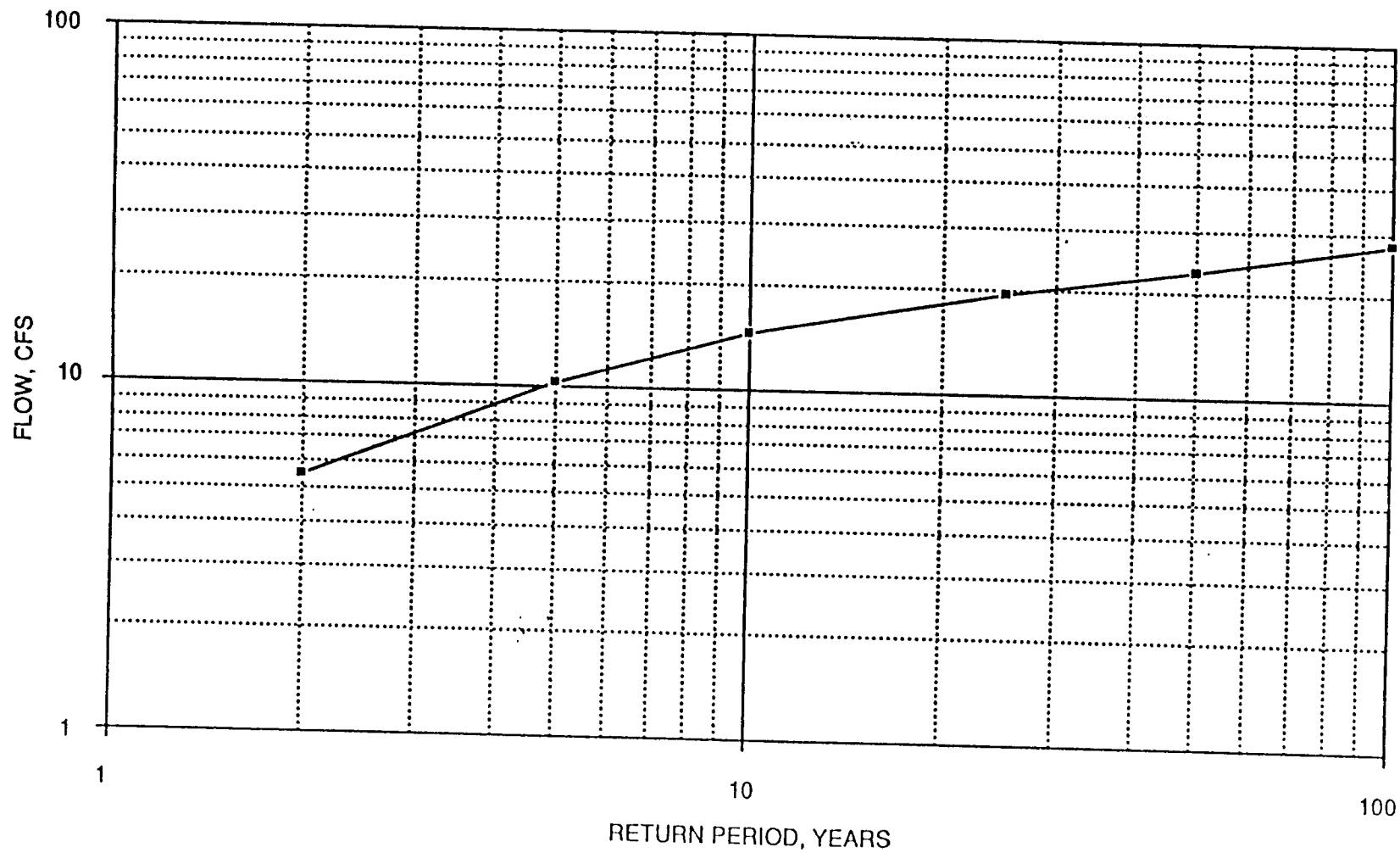


Figure 3-3
MISS Peak Flow/Return Period Relationship

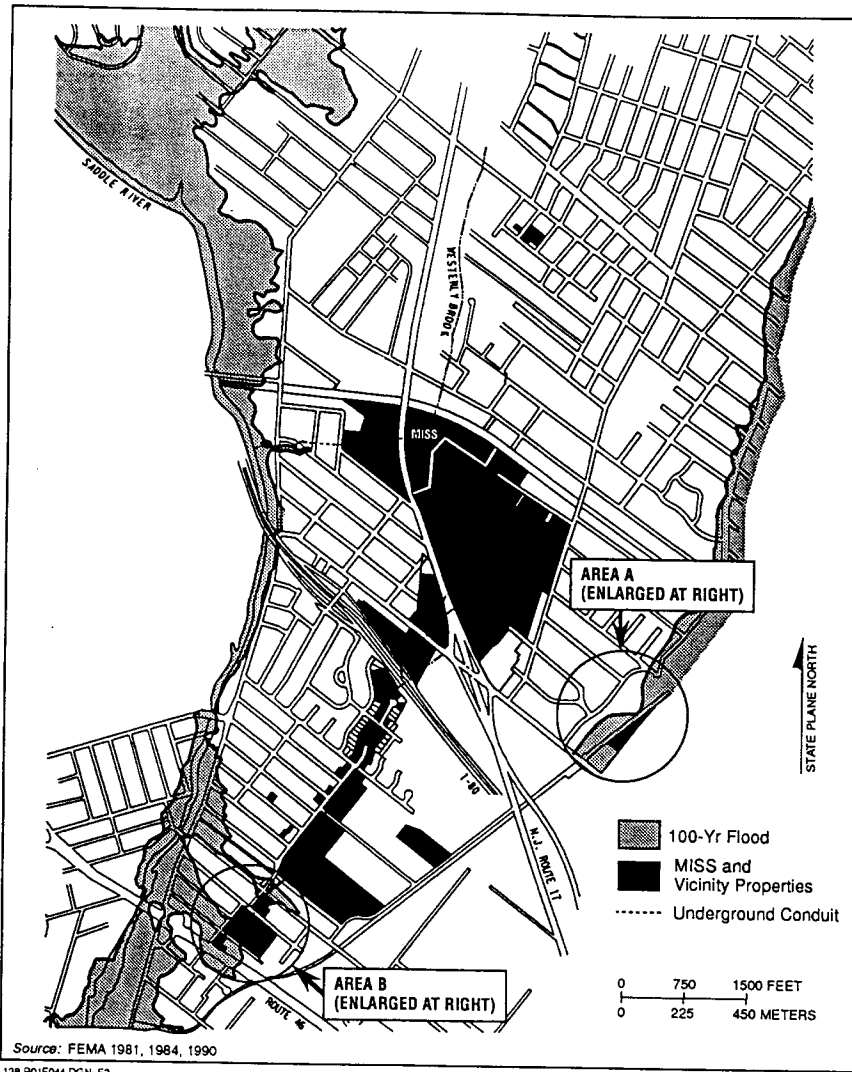
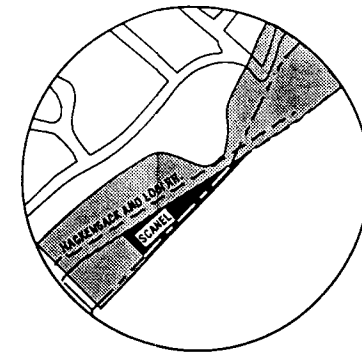
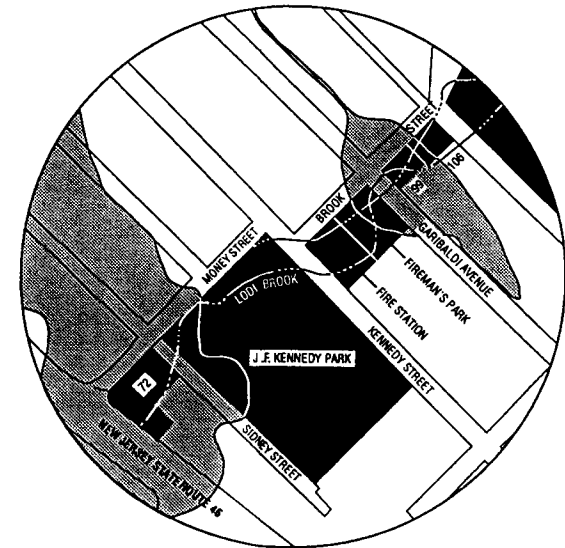


Figure 3-4
100-Year-Flood Zones in the Maywood Area

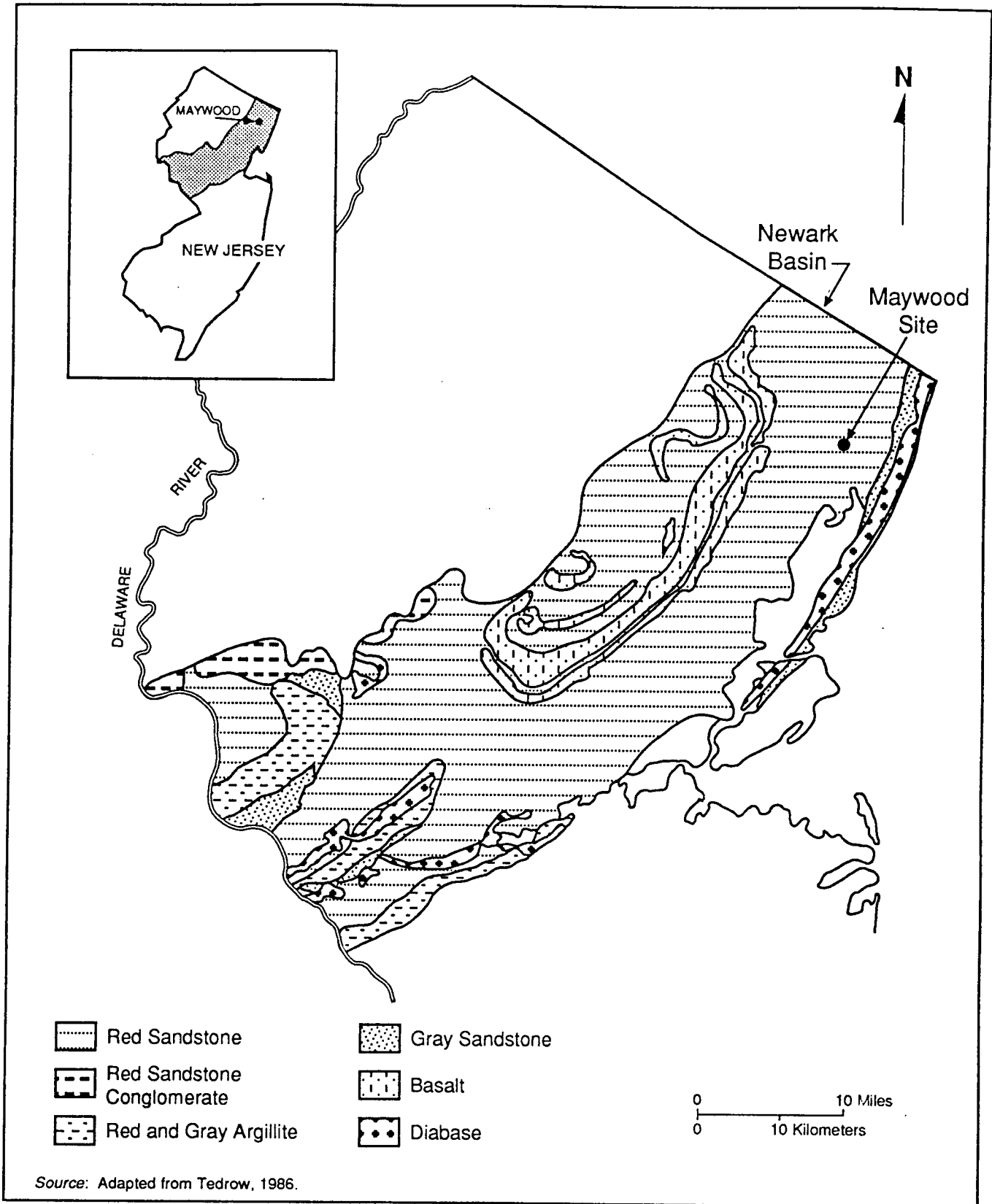


Area A



Area B

Areas A and B show the only MISS/Vicinity properties that would be affected by a 100-year flood.



Source: Adapted from Tedrow, 1986.

Figure 3-5
Distribution of Triassic/Jurassic Formations in the Newark Basin

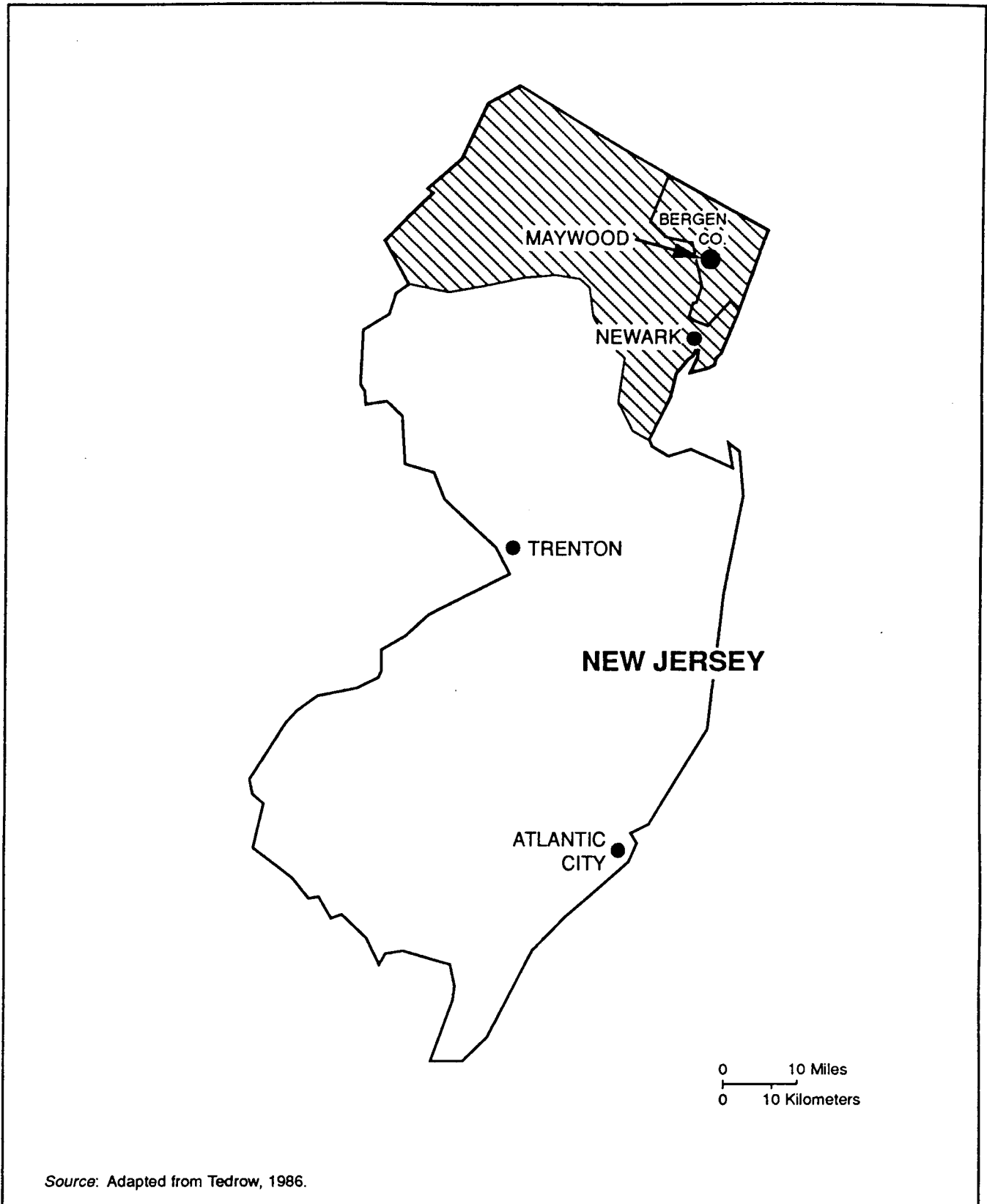


Figure 3-6
Ice Cover in New Jersey During Wisconsin Glacial Maximum

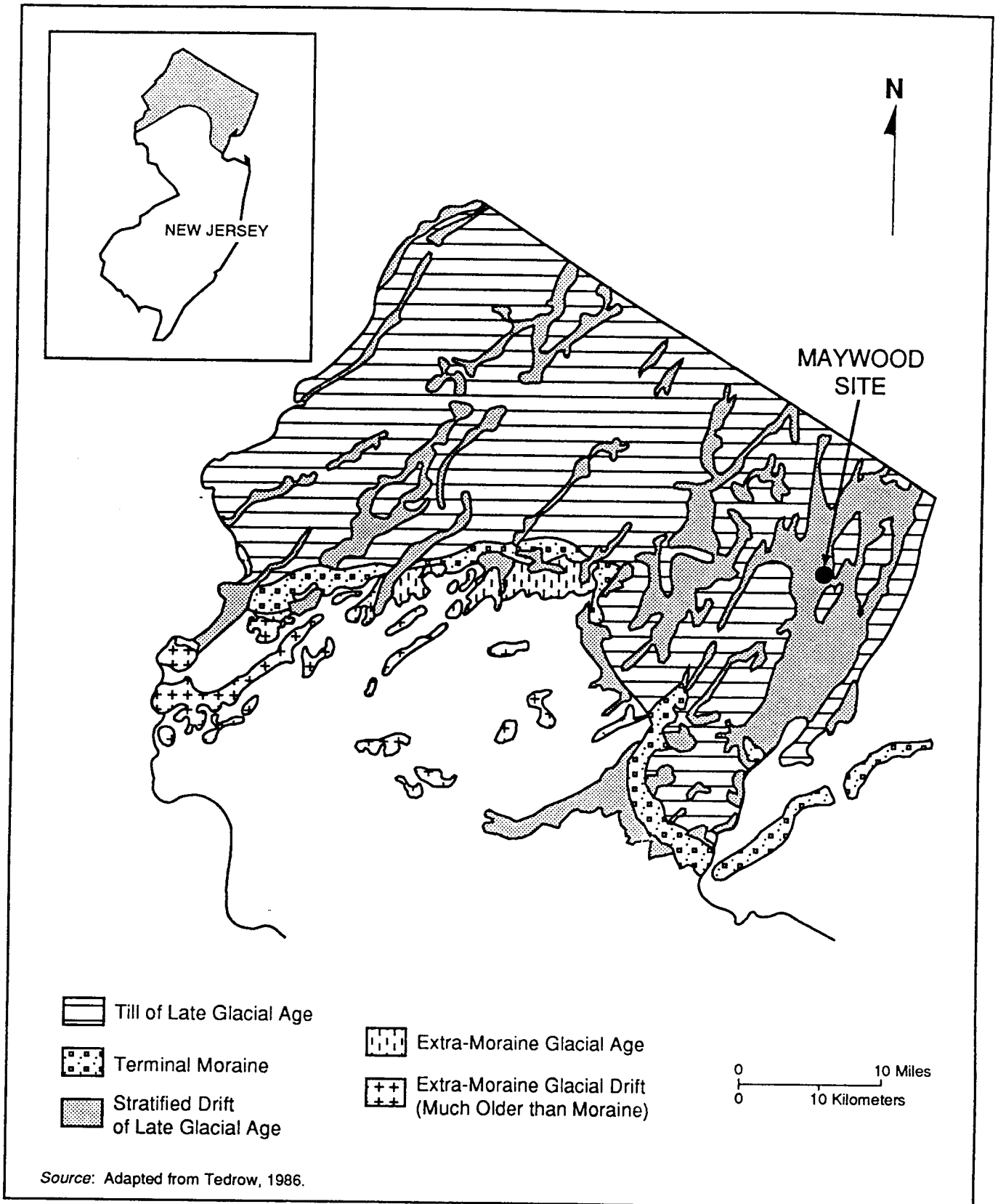
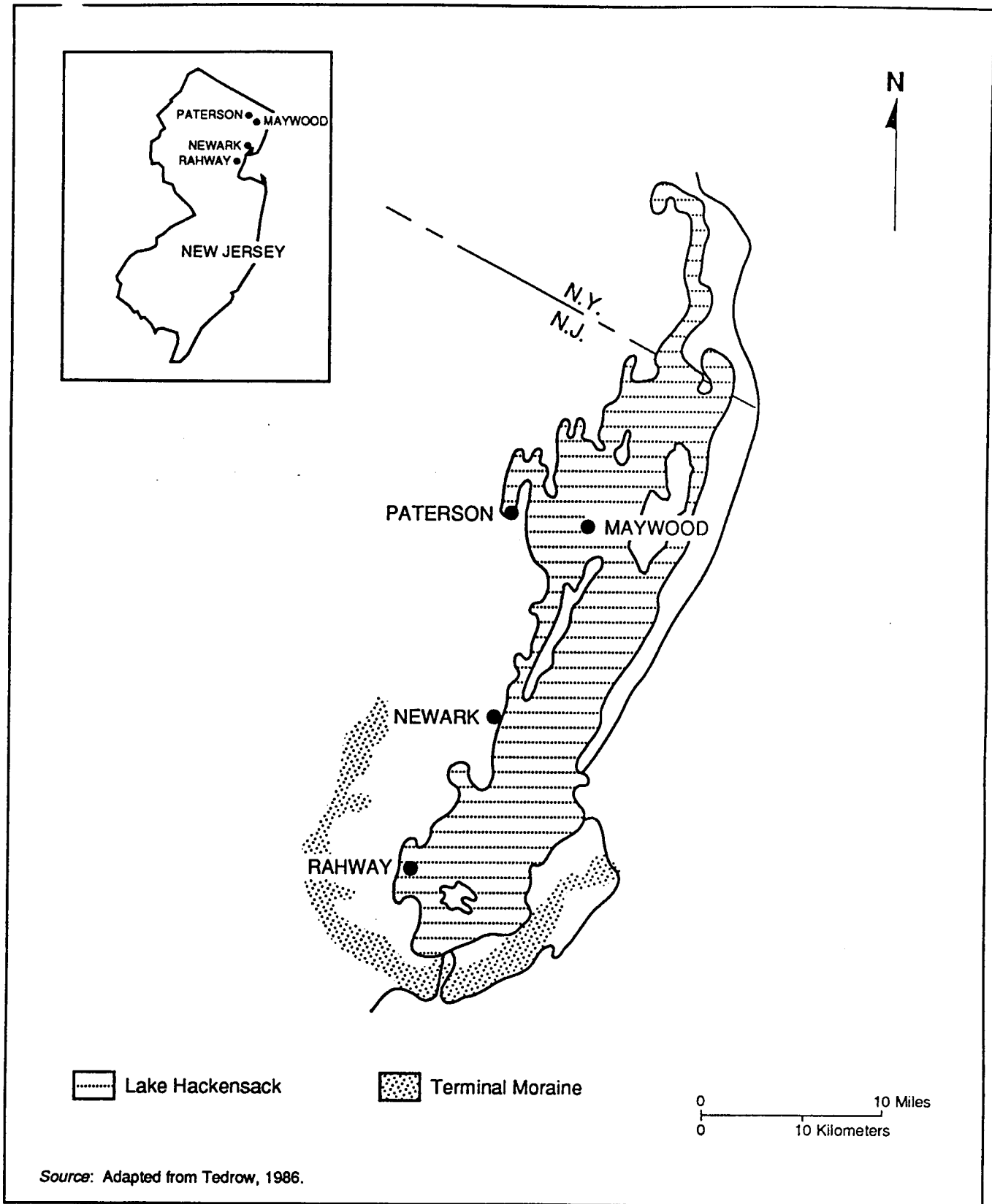
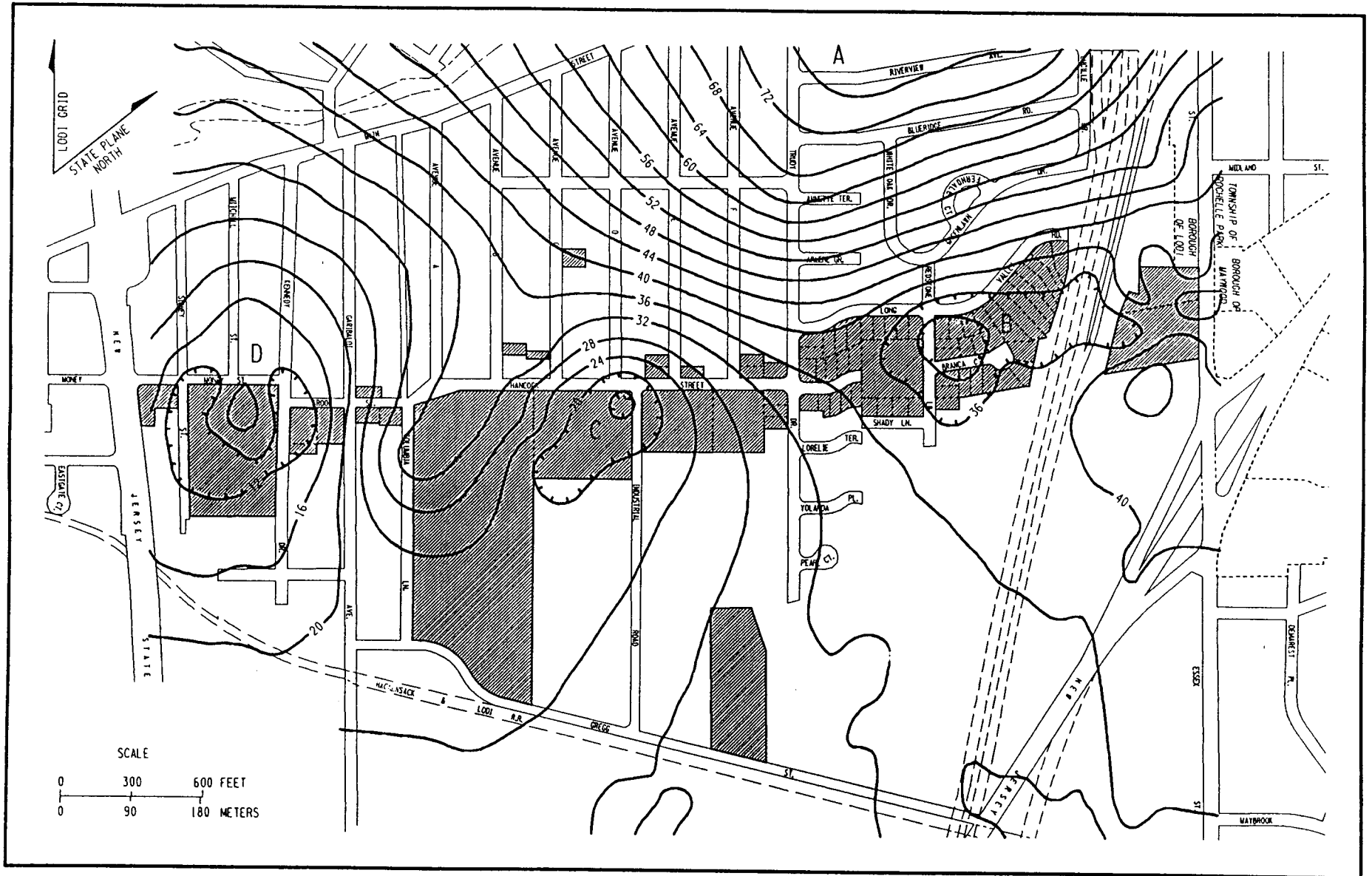


Figure 3-7
Glacial Deposits in New Jersey



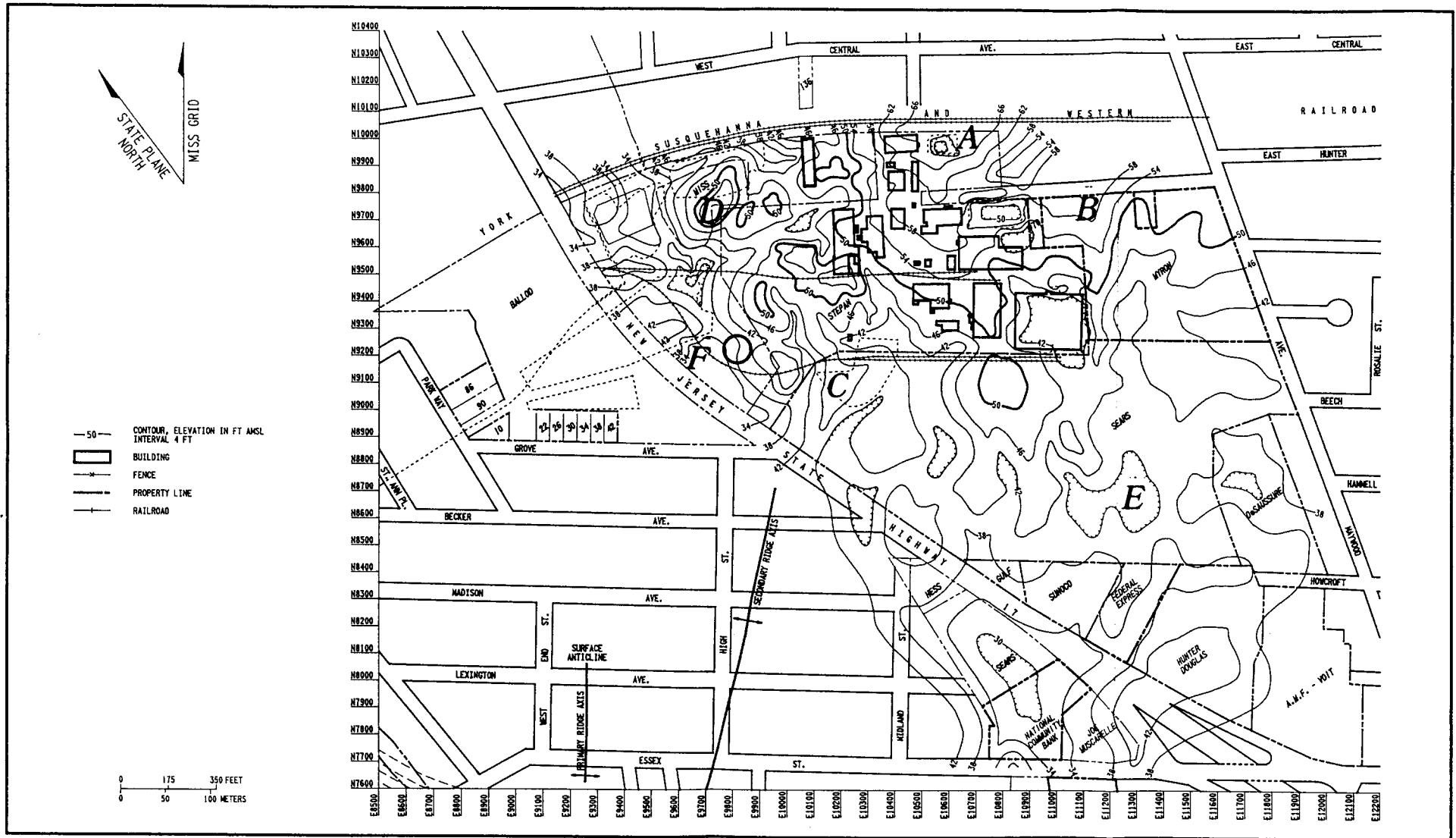
Source: Adapted from Tedrow, 1986.

Figure 3-8
Preglacial Lake Hackensack



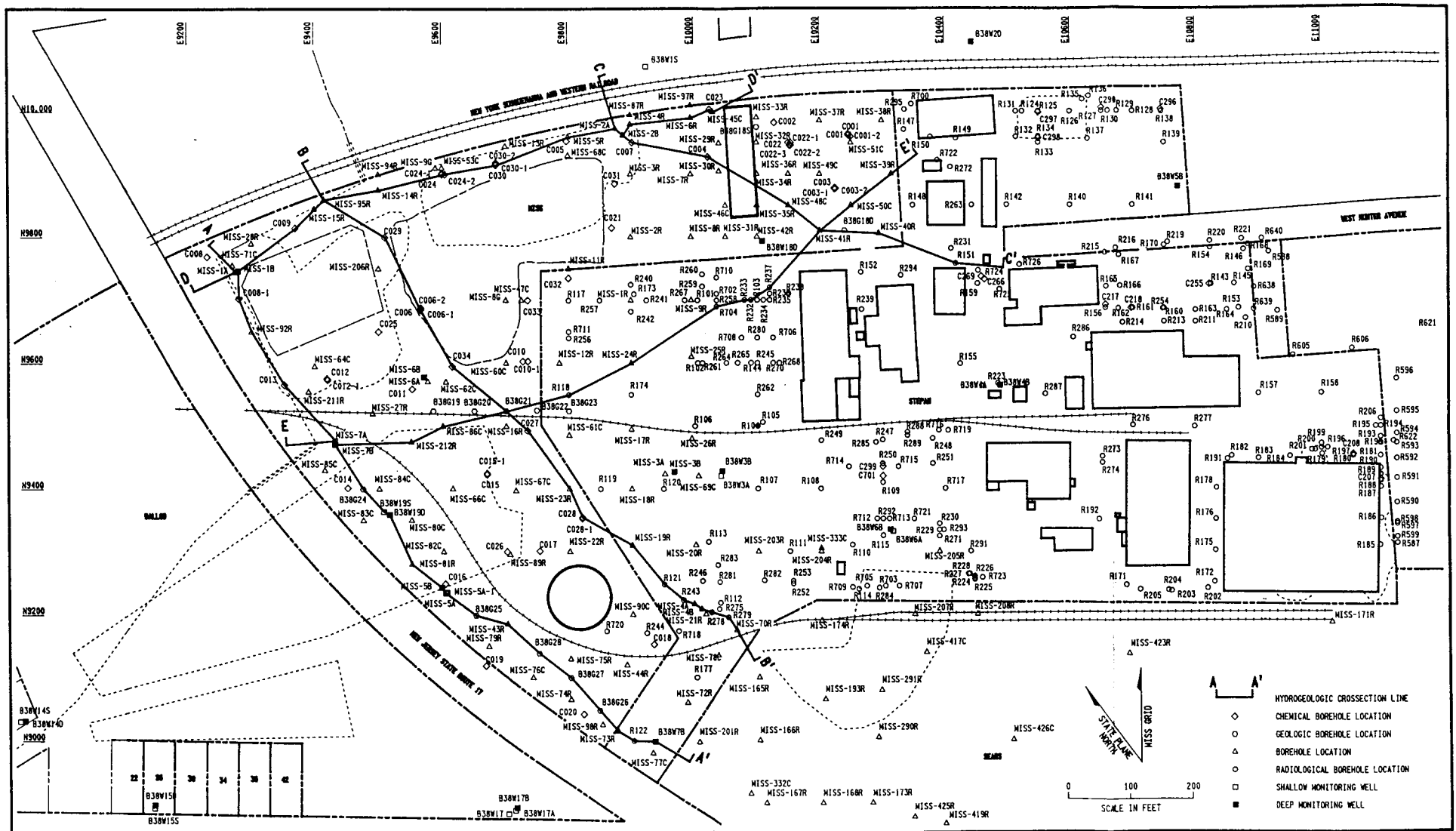
R01F066.DGN F1

Figure 3-9
Contour Map of the Top of Bedrock in the Lodi Area



RO1F092.DGN

Figure 3-10
Contour Map of the Top of Bedrock in the Maywood Area



ROI\F083.DGN

Figure 3-11
Locations of Hydrogeologic Cross Section A-A', B-B', C-C', D-D',
and E-E' at MISS

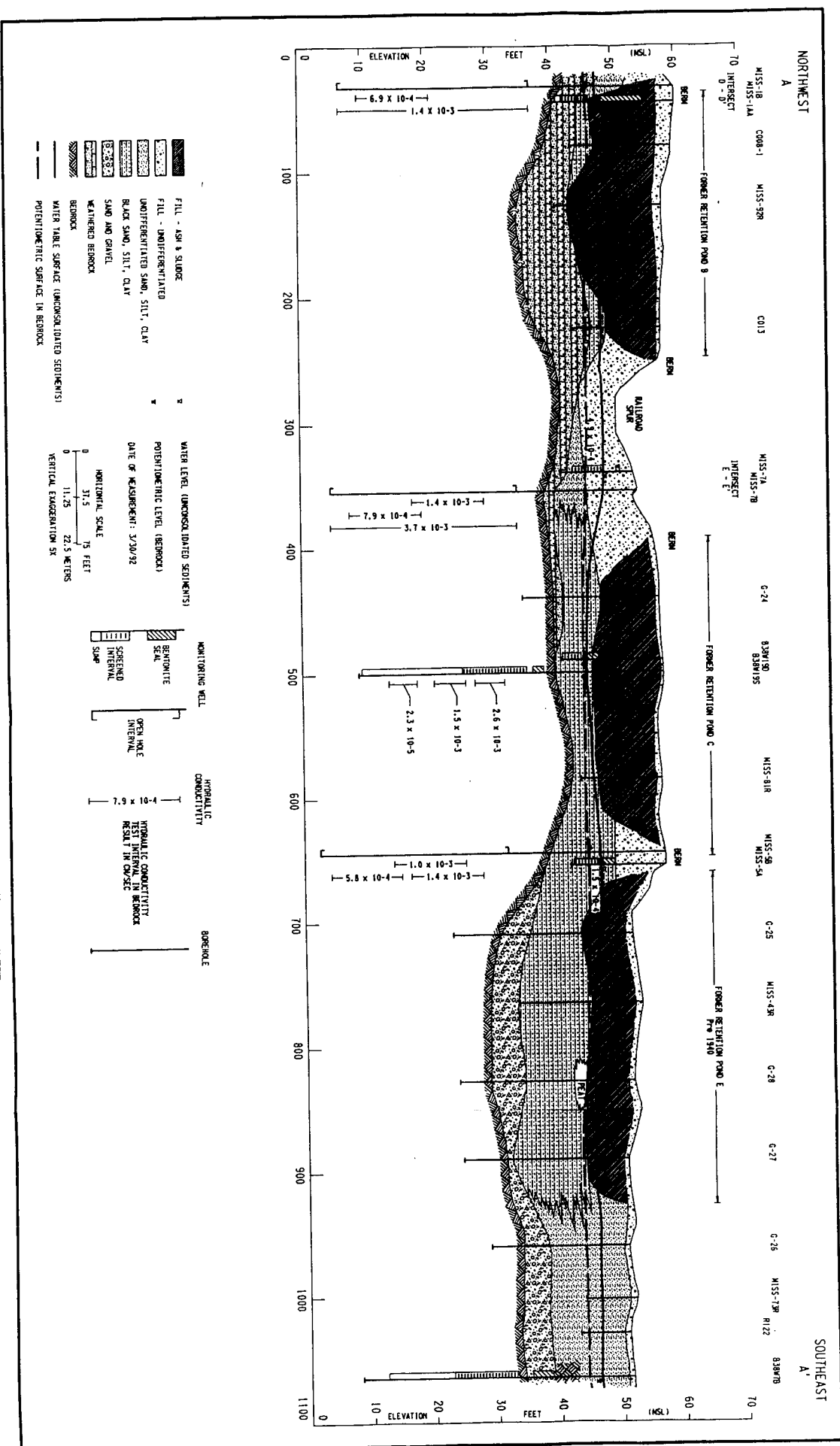
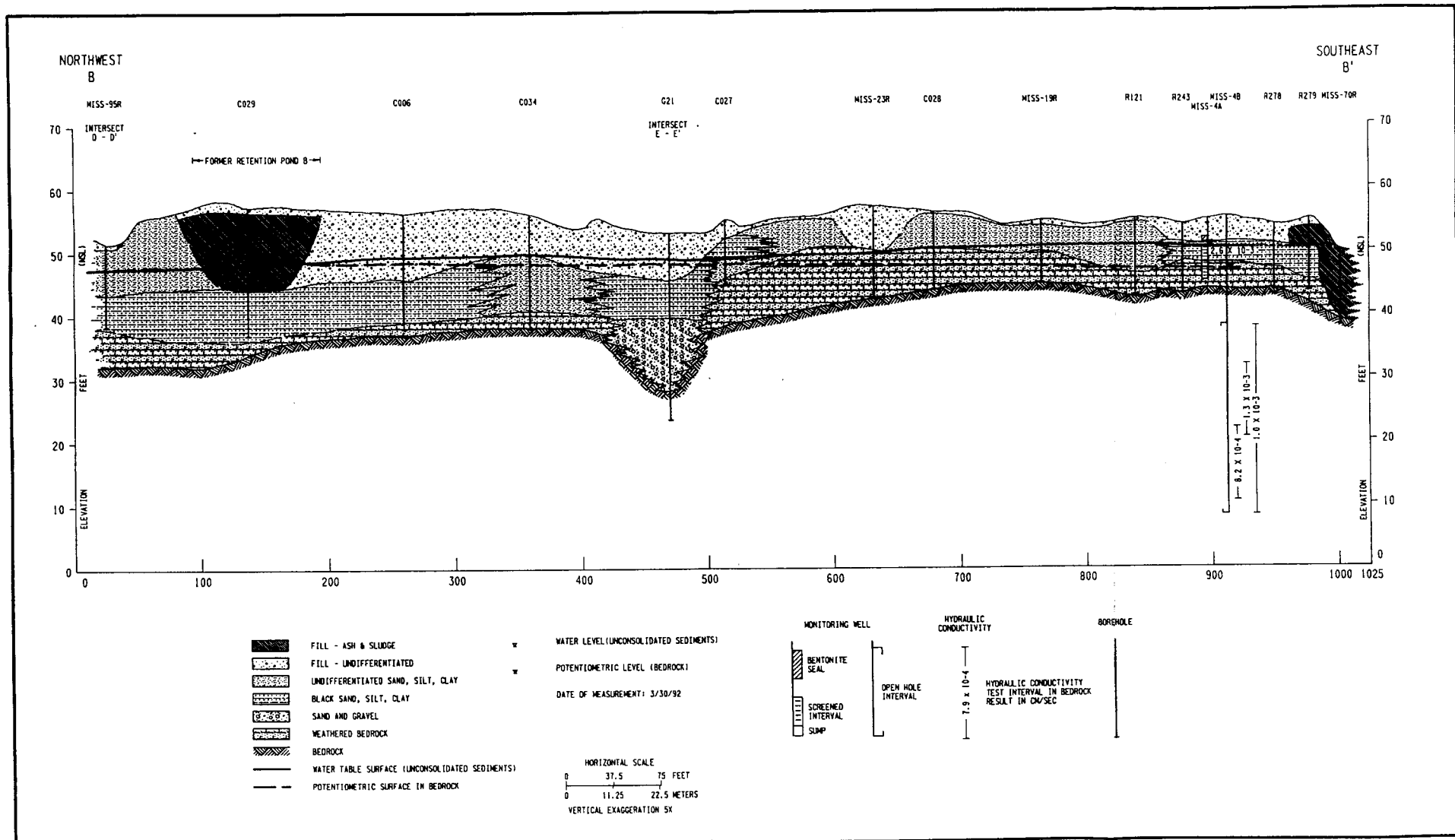


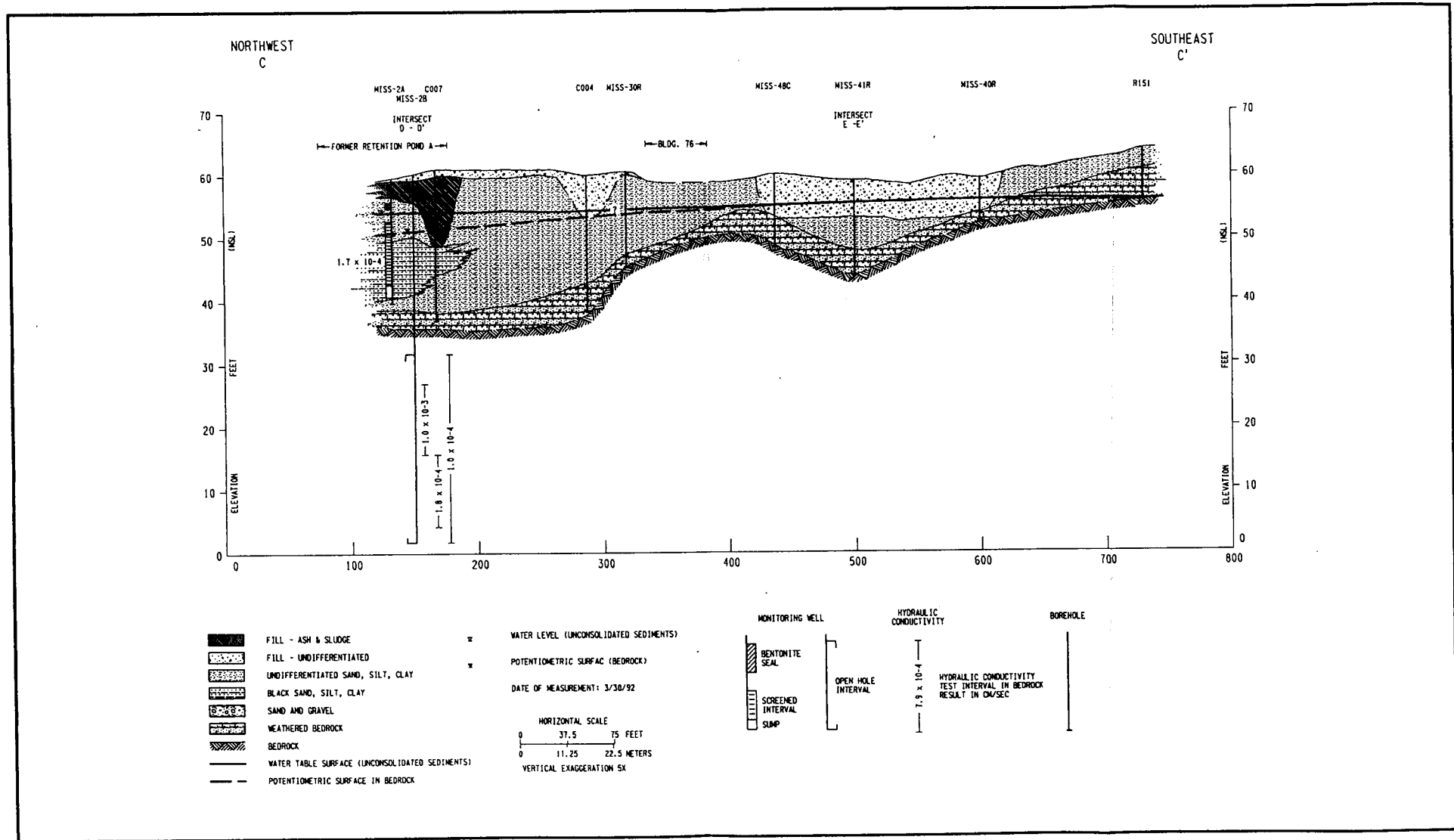
Figure 3-12
 Hydrogeologic Cross Section A-A at MISS

138 R01F064.DGN F3



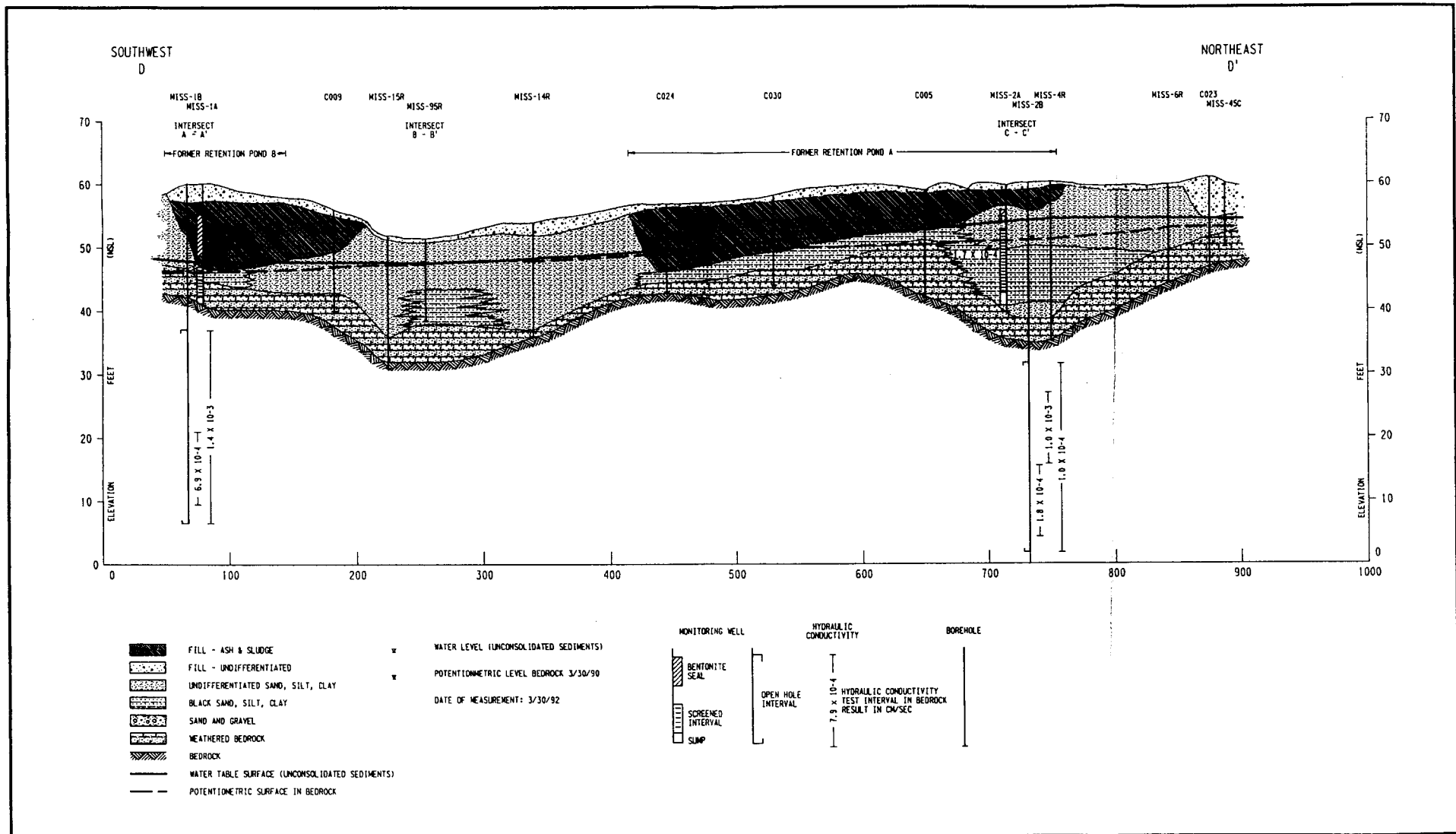
138 R01F071.DGN F2

Figure 3-13
Hydrogeologic Cross Section B-B' at MISS



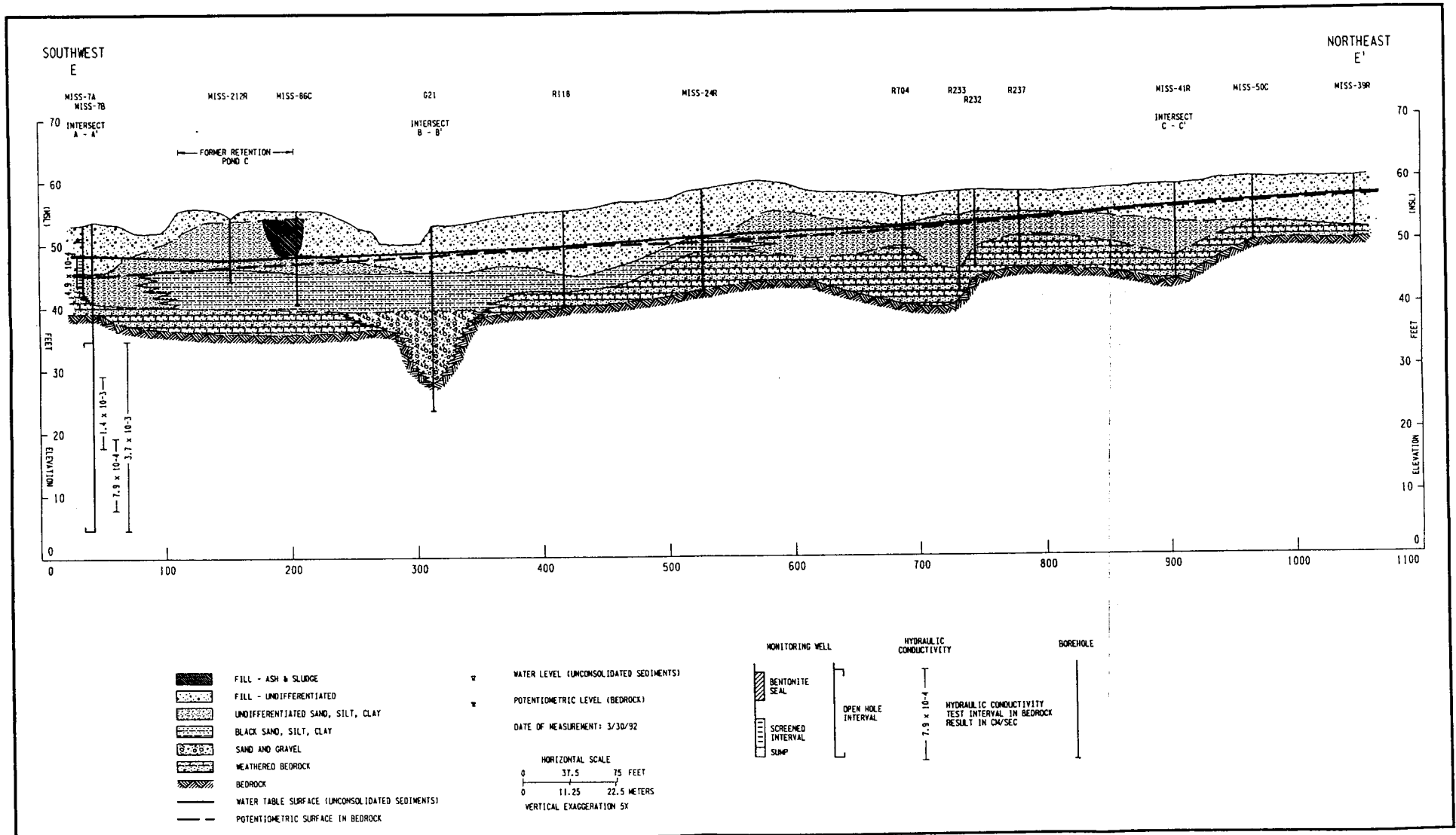
138 RQIF069.DGN F2

Figure 3-14
Hydrogeologic Cross Section C-C' at MISS



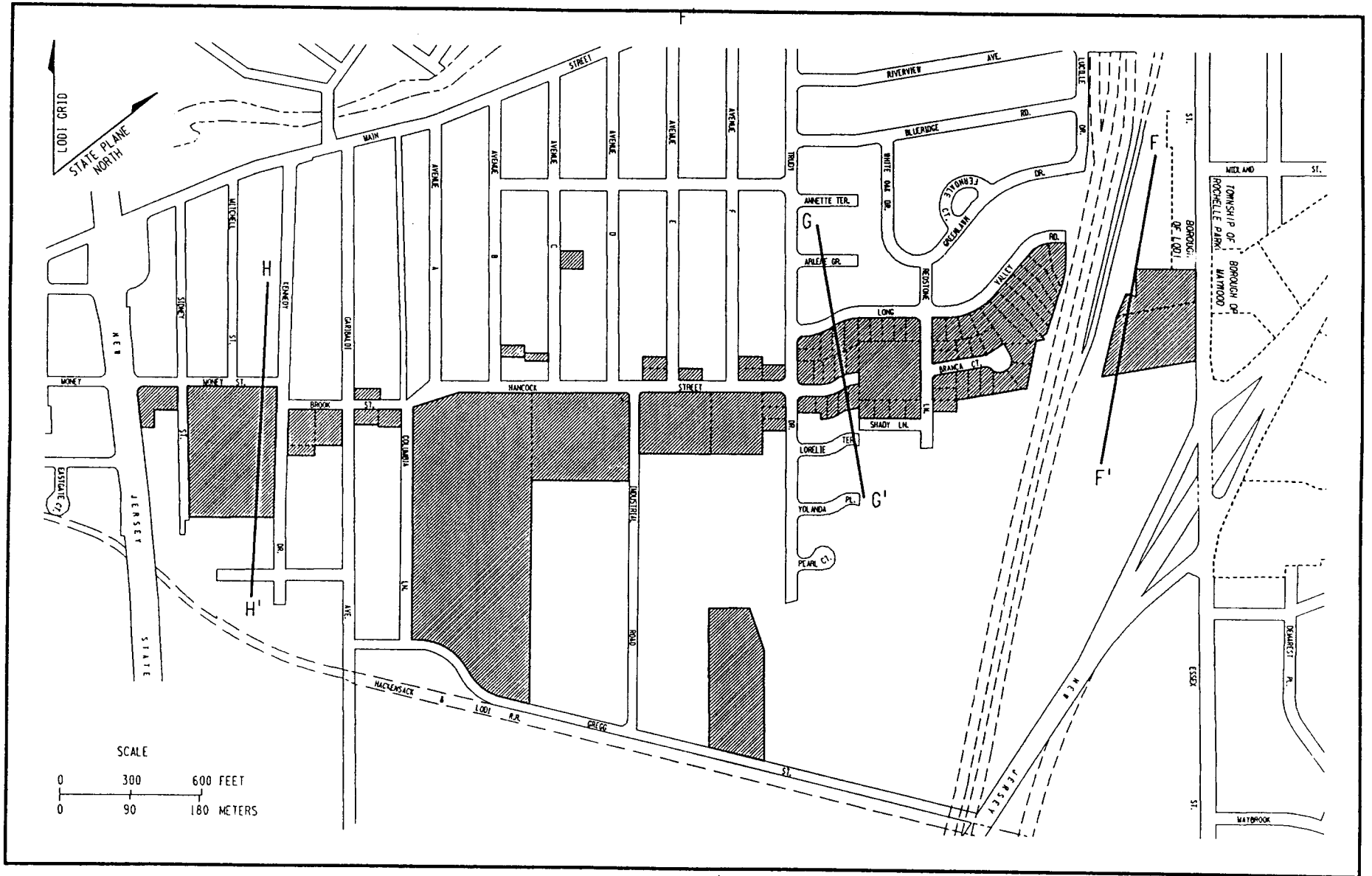
138 138f070.DGN F4

Figure 3-15
Hydrogeologic Cross Section D-D' at MISS



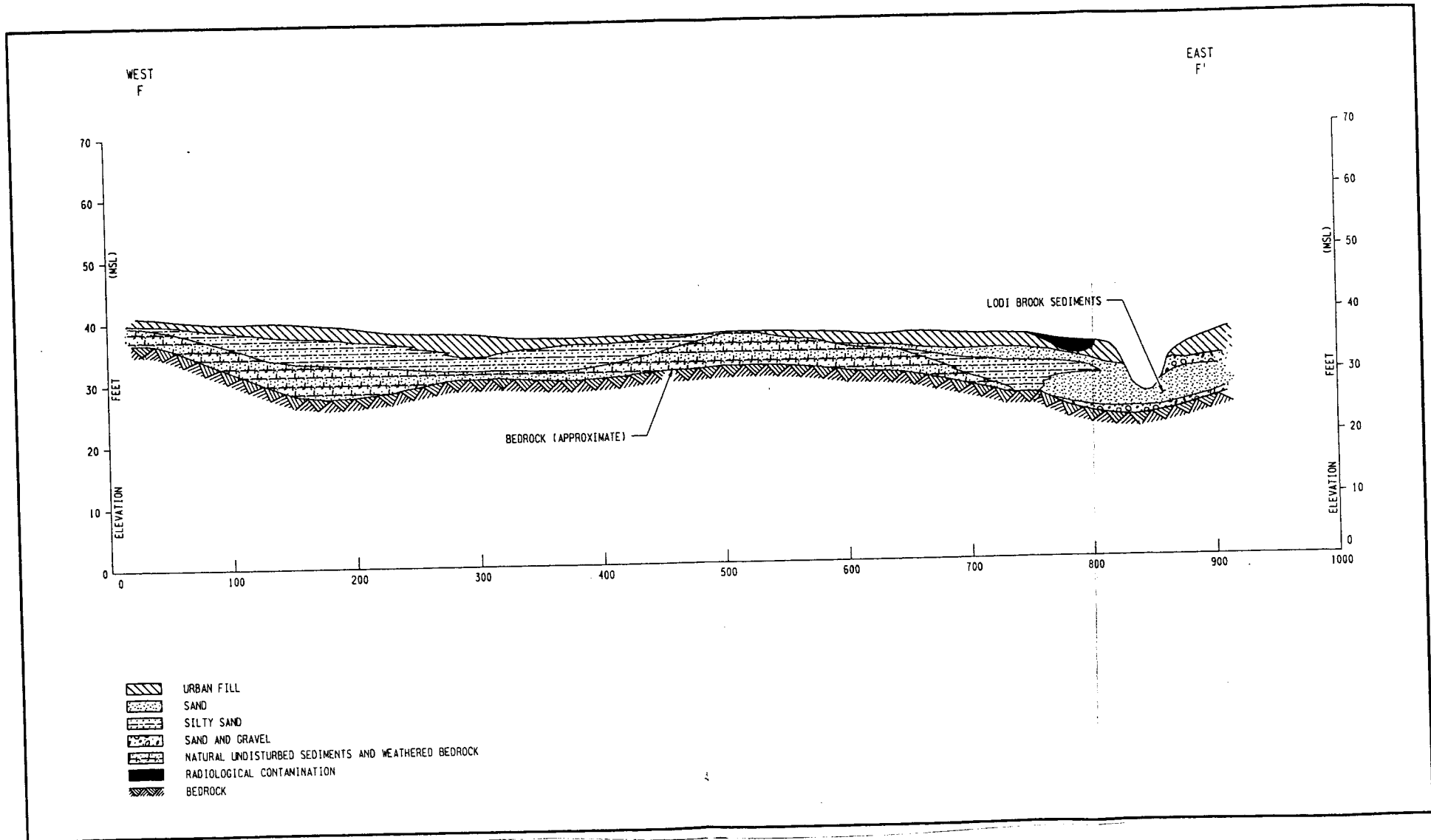
138 R01F072.DGN F2

Figure 3-16
Hydrogeologic Cross Section E-E' at MISS



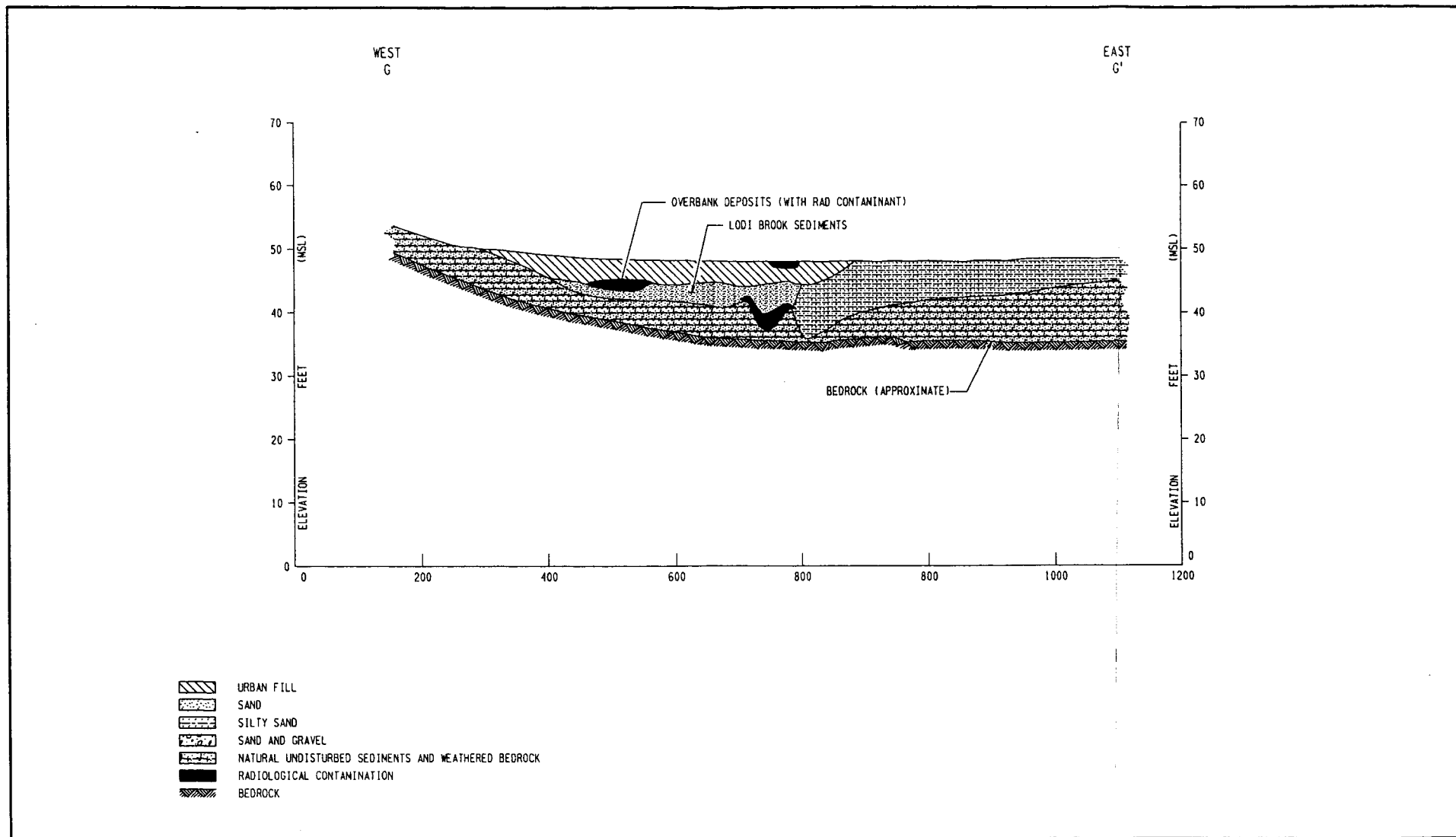
R01F066.DGN F3

Figure 3-17
Approximate Locations of Diagrammatic Cross Sections of the Lodi Study Area



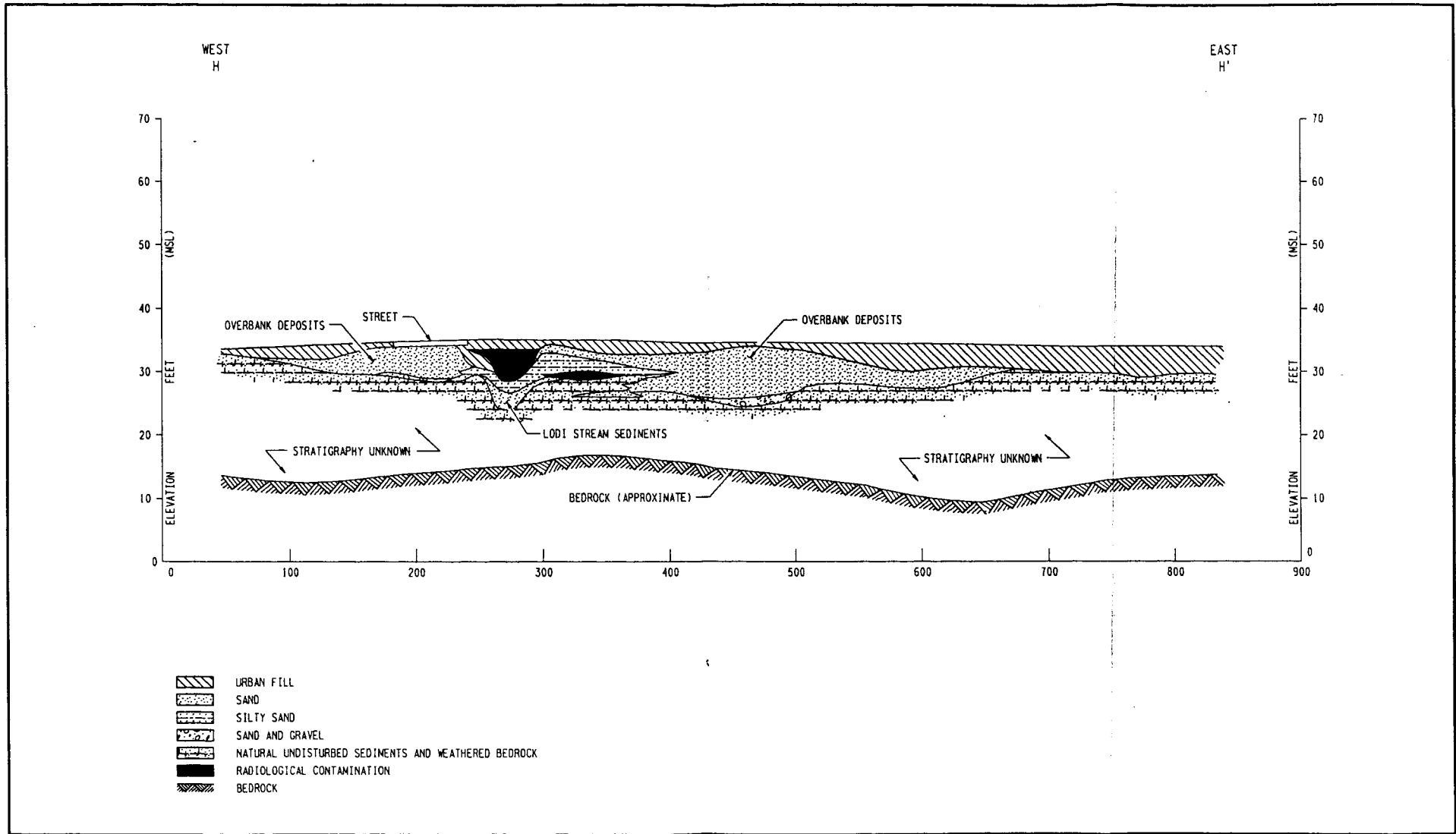
138 R01F087.DGN

Figure 3-18
Diagrammatic Cross Section F-F' of Lodi Study Area



138 R01F085.DGN

Figure 3-19
Diagrammatic Cross Section G-G' of Lodi Study Area



138 R01F084.DGN

Figure 3-20
Diagrammatic Cross Section H-H' of Lodi Study Area

3-75

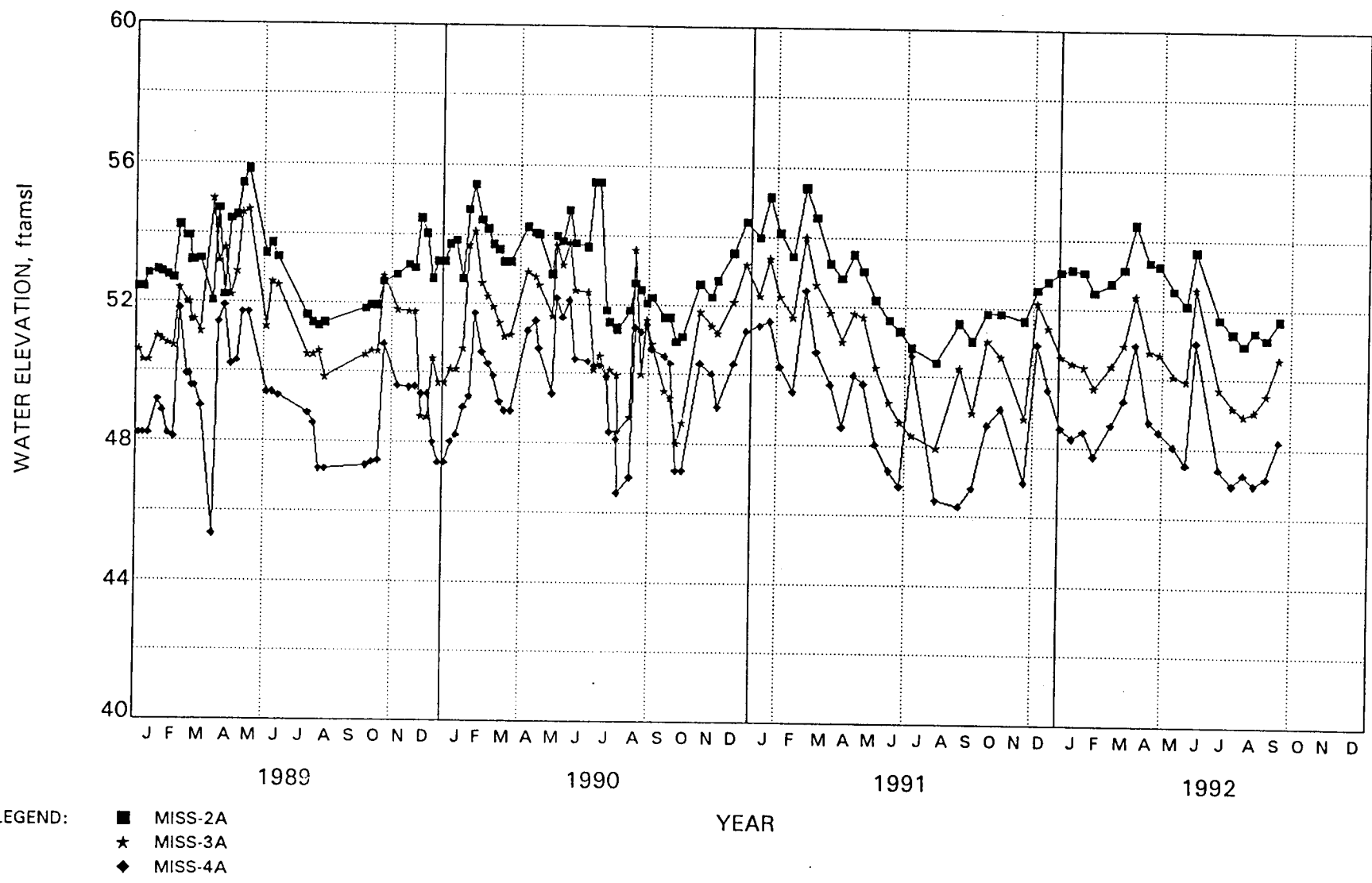


Figure 3-21
Hydrographs, Wells MISS-2A, MISS-3A, and MISS-4A

3-76

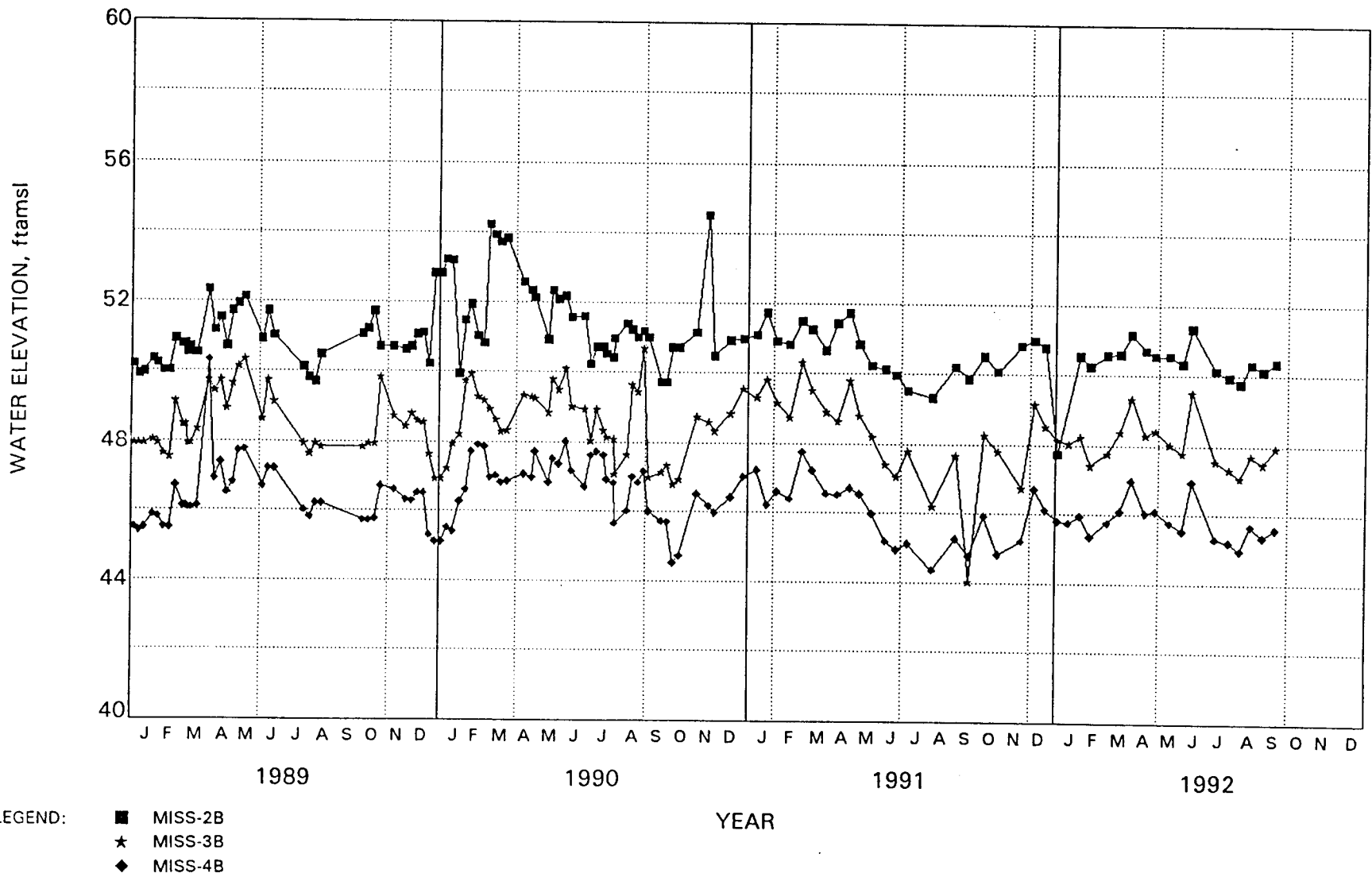
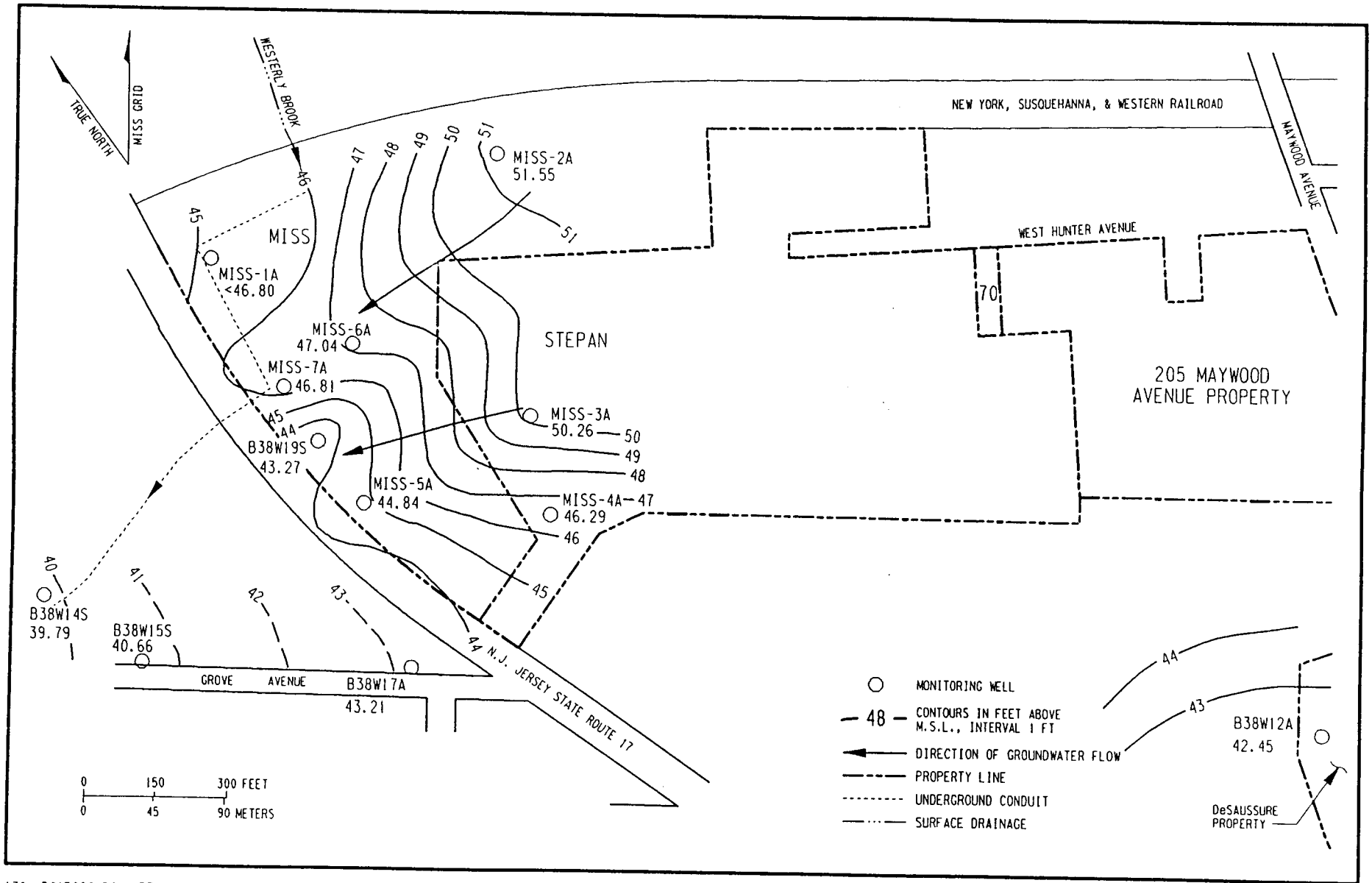


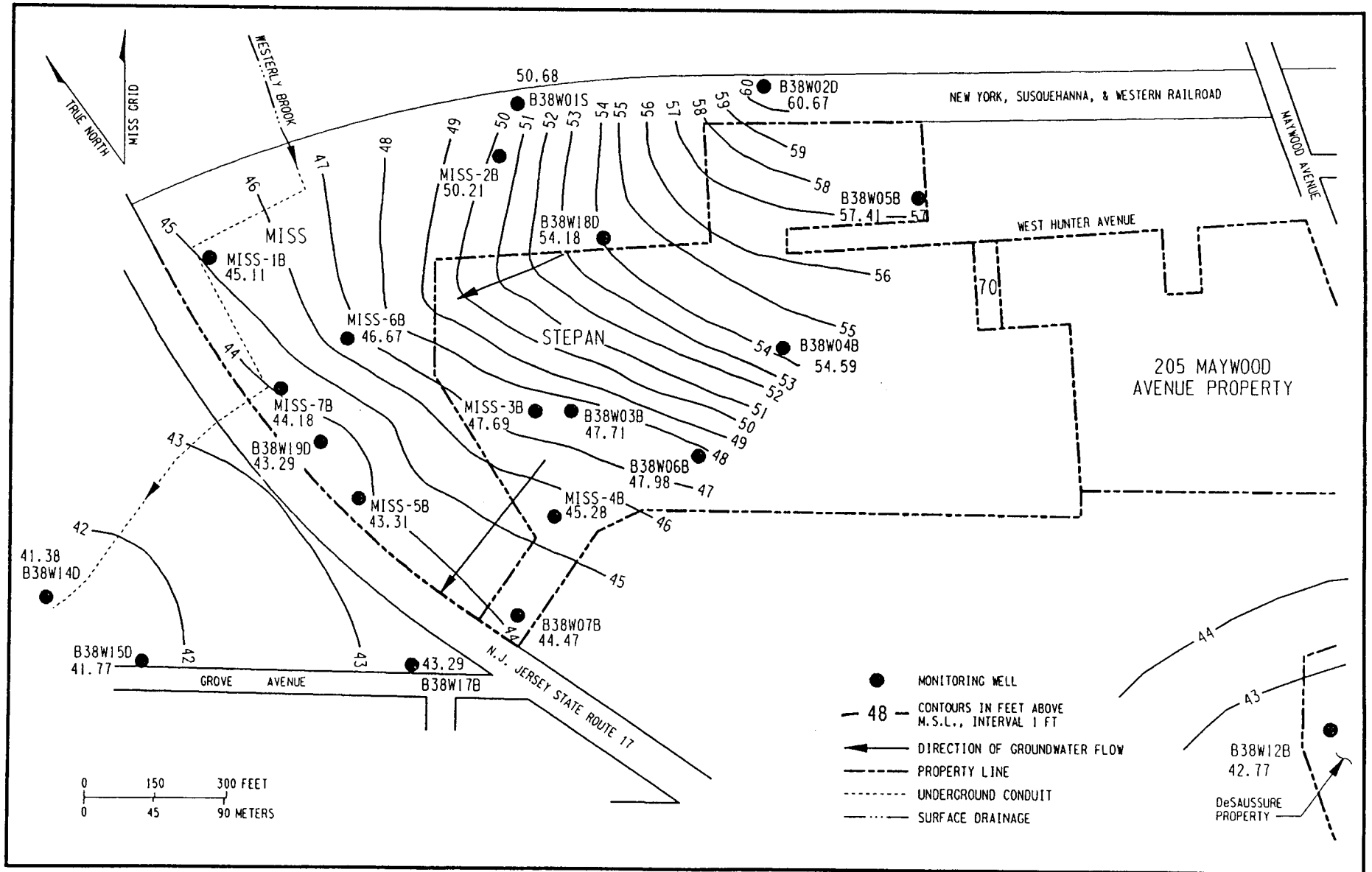
Figure 3-22
Hydrographs, Wells MISS-2B, MISS-3B, and MISS-4B

3-77



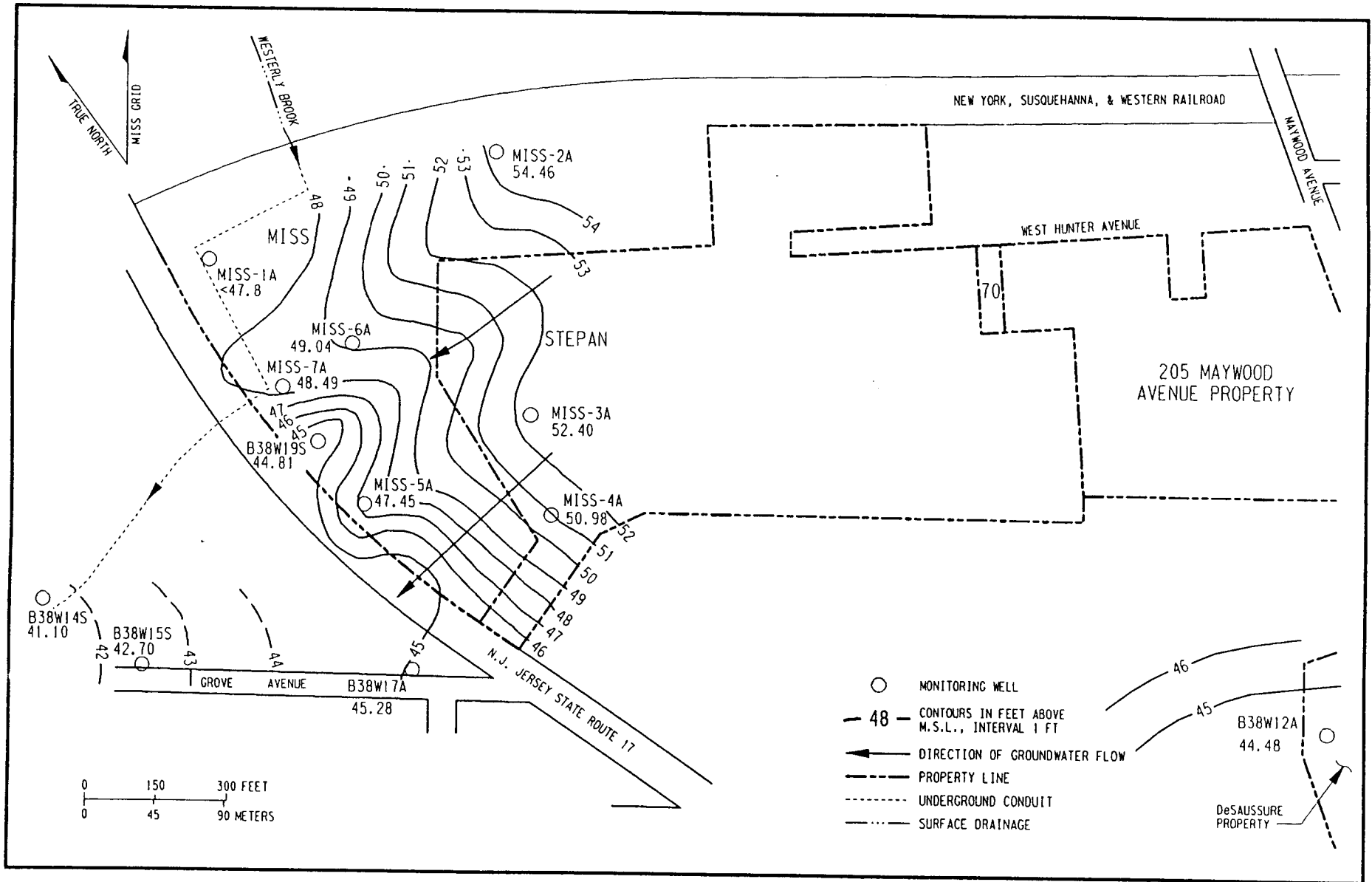
138 ROIF020.DGN F7

Figure 3-23
Contour Map Showing Water Level Elevations in Unconsolidated Sediments
at MISS, September 4, 1991



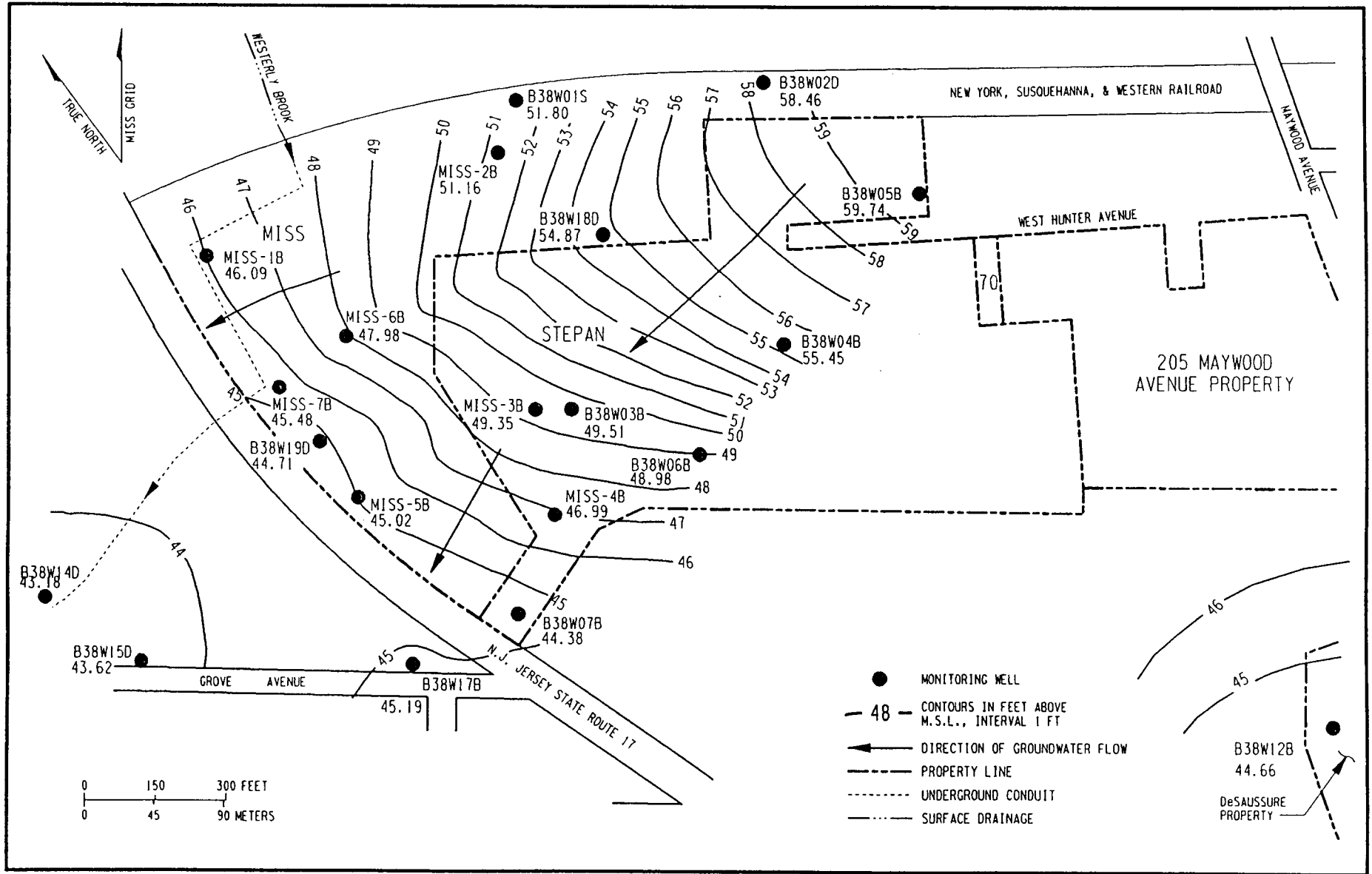
138 ROIF020.DGN F8

Figure 3-24
 Contour Map Showing Water Level Elevations in Bedrock
 at MISS, September 4, 1991



138 R01F020.DGN F5

Figure 3-25
 Contour Map Showing Water Level Elevations in Unconsolidated Sediments
 at MISS, March 30, 1992



138 ROIF020.DGN F6

Figure 3-26
Contour Map Showing Water Level Elevations in Bedrock
at MISS, March 30, 1992

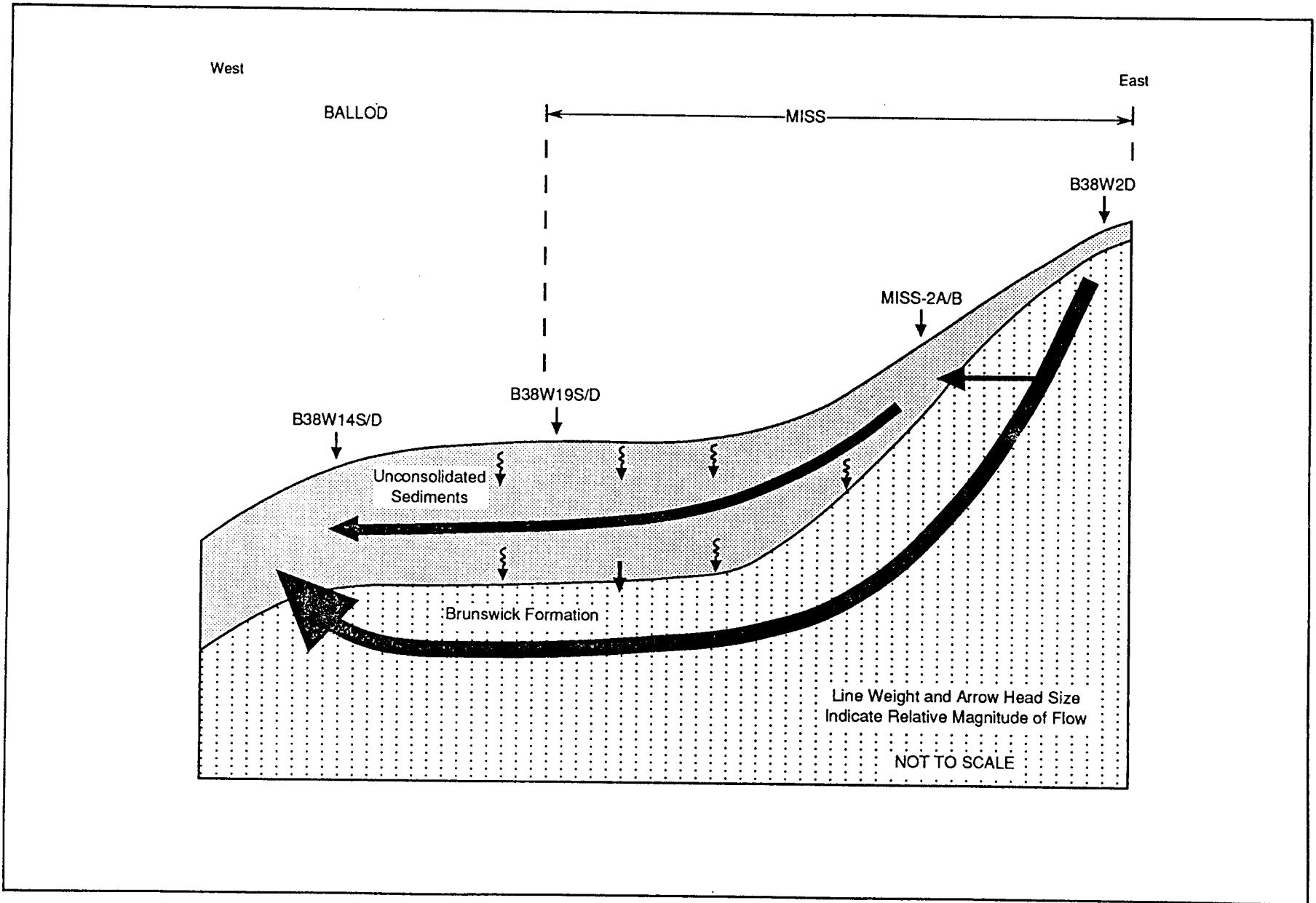


Figure 3-27
Conceptual Groundwater Flow System at MISS

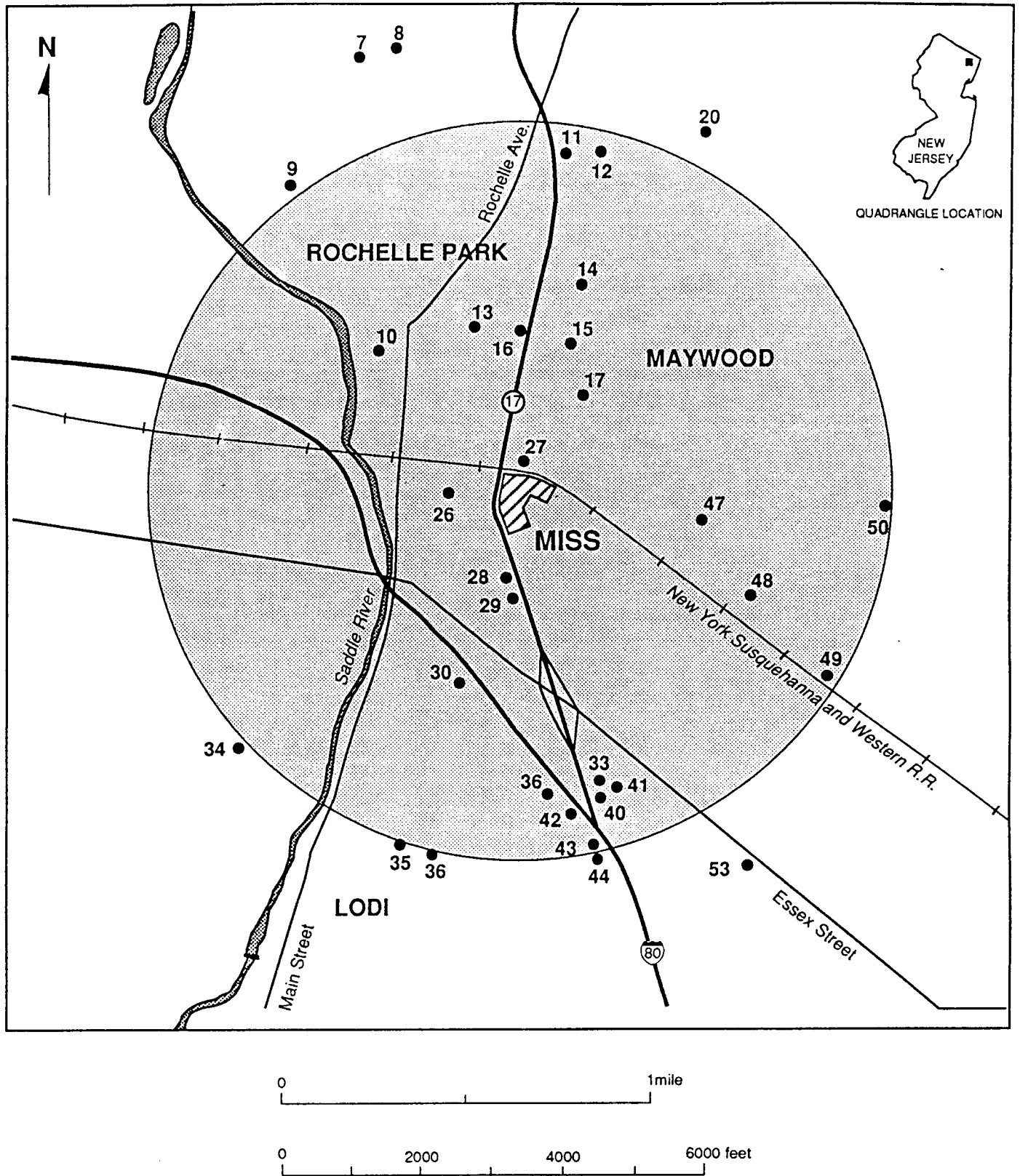


Figure 3-28
Locations of Water Wells Within Approximately 1 Mile of MISS

TABLES FOR SECTION 3.0

Table 3-1
Summary of Climatological Data for
the Newark Vicinity, 1951-1980

Month	Normal Temperatures (°F)			Normal Precip (in.)	Wind	
	Min	Max	Avg		Mean Speed (mph)	Prevailing Direction
January	24.2	38.2	31.3	3.13	11.3	NE
February	25.3	40.3	32.8	3.05	11.6	NW
March	33.3	49.1	41.2	4.15	12.0	NW
April	42.9	61.3	52.1	3.57	11.4	WNW
May	53.0	71.6	62.3	3.59	10.0	SW
June	62.4	80.6	71.5	2.94	9.4	SW
July	67.9	85.6	76.8	3.85	8.9	SW
August	67.0	84.0	75.5	4.30	8.7	SW
September	59.4	76.9	68.2	3.66	9.0	SW
October	48.3	66.0	57.2	3.09	9.4	SW
November	39.0	54.0	46.5	3.59	10.1	SW
December	28.6	42.3	35.5	3.42	10.8	SW
Annual	45.9	62.5	54.2	42.34	10.2	SW

Source: Gale Research Company 1985.

Table 3-2
Field Permeability Test Results

Page 1 of 2

Well ID	Date Tested	Interval Tested (ft BGS)	Type of Test ^a	Calculated Hydraulic Conductivity (cm/s)	Average Hydraulic Conductivity (cm/s)
<u>UNCONSOLIDATED SEDIMENTS</u>					
MISS-2A	10/29/84	5.0 - 18.9	Rec	1.7×10^{-4}	1.7×10^{-4}
MISS-3A	10/25/84	5.0 - 12.7	Fh	5.7×10^{-2}	2.9×10^{-2}
		5.0 - 12.7	Rec	1.6×10^{-3}	
MISS-4A	10/26/84	0.3 - 9.7	Rec	2.6×10^{-5}	2.6×10^{-5}
MISS-5A	11/01/84	10.0 - 14.6	Fh	1.5×10^{-4}	1.5×10^{-4}
MISS-7A	11/10/84	2.5 - 9.6	Chg	4.9×10^{-4}	4.9×10^{-4}
<u>BEDROCK</u>					
MISS-1B	11/13/84	39.0 - 50.5	Chp	6.9×10^{-4}	1.2×10^{-3}
		23.0 - 53.5	Chg	1.3×10^{-3}	
		23.0 - 53.5	Rec	1.5×10^{-3}	
MISS-2B	11/12/84	33.0 - 44.5	Chp	1.0×10^{-3}	4.3×10^{-4}
		44.5 - 56.0	Chp	1.8×10^{-4}	
		28.5 - 58.5	Rec	1.0×10^{-4}	
MISS-3B	11/08/84	24.4 - 35.9	Chp	7.9×10^{-5}	4.7×10^{-4}
		34.4 - 45.9	Chp	1.1×10^{-3}	
		20.0 - 50.0	Fh	3.8×10^{-4}	
		20.0 - 50.0	Rec	3.1×10^{-4}	
MISS-4B	11/10/84	23.2 - 34.7	Chp	1.3×10^{-3}	1.1×10^{-3}
		33.2 - 44.7	Chp	8.2×10^{-4}	
		17.0 - 47.0	Chg	1.4×10^{-3}	
		17.0 - 47.0	Rec	6.6×10^{-4}	
MISS-5B	11/10/84	28.8 - 40.3	Chp	1.4×10^{-3}	9.9×10^{-4}
		31.8 - 43.3	Chp	1.0×10^{-3}	
		41.8 - 53.3	Chp	5.8×10^{-4}	
MISS-7B	11/10/84	24.6 - 36.1	Chp	1.4×10^{-3}	2.4×10^{-3}
		34.6 - 46.1	Chp	7.9×10^{-4}	
		19.0 - 49.0	Chg	3.5×10^{-3}	
		19.0 - 49.0	Rec	4.0×10^{-3}	
B38W18D	10/19/88	14.0 - 21.8	Chp	1.9×10^{-4}	9.7×10^{-5}
		22.0 - 31.8	Chp	7.9×10^{-5}	
		31.0 - 41.2	Chp	2.2×10^{-5}	
B38W19D	10/11/89	25.2 - 30.0	Chp	2.6×10^{-3}	1.4×10^{-3}
		31.6 - 36.4	Chp	1.5×10^{-3}	
		39.1 - 43.9	Chp	2.3×10^{-5}	

**Table 3-2
(continued)**

Page 2 of 2

Well ID	Date Tested	Interval Tested (ft BGS)	Type of Test ^a	Calculated Hydraulic Conductivity (cm/s)
UNCONSOLIDATED SEDIMENTS				
B38G19	09/18/89	10	Fhv	1.6×10^{-5}
B38G20	09/14/89	12	Fhv	2.2×10^{-3}
B38G24	10/02/89	15	Fhv	2.3×10^{-4}
B38G25	09/22/89	14	Fhv	7.3×10^{-6}
B38G26	09/30/89	6	Fhv	2.7×10^{-4}
B38G27	09/27/89	12	Fhv	9.3×10^{-6}
B38G28	09/25/89	12	Fhv	1.8×10^{-5}
	09/25/89	20		5.5×10^{-4}
MISS-2A	10/29/84	7.5 - 10	Fhv	5.3×10^{-6}
		12.5 - 15	Fhv	3.4×10^{-5}
		17.5 - 20	Fhv	6.6×10^{-5}
B38W14S	11/04/88	14	Fhv	1.1×10^{-5}
B38W15S	11/08/88	6	Fhv	5.4×10^{-6}
		11	Fhv	8.8×10^{-4}

^aChg = Constant head gravity; Chp = Constant head pressure (packer); Fh = Falling head; Rec = Recovery; Fhv = Falling head vertical.

Table 3-3

Permeability Test Methods

Test Method	Method Application ¹	Interpretation Method	Common Sources of Error ²
Fh	Well: low to moderate permeability	Case G - Basic Time Lag (Hvorslev 1951)	A, B
Rec	Well: low to high permeability	Jacob Recovery Method (Johnson UOP 1975)	A, B
Chg	Well: moderate permeability	Case F - Constant Head (Hvorslev 1951)	A, B, C
Chp	Open hole, bedrock: low to moderate permeability	PX-D-4785 Packer Test (USBR 1974)	A, B, C
Fhv	Open end casing, soil: low to moderate permeability	Case C - Variable Head or Basic Time Lag (Hvorslev 1951)	A

¹Permeability ranges are subjective and are controlled by factors such as the rapidity of water level change during the test and the capacity of the pumping equipment.

²Common sources of error (EPA 1986):

- A Errors in determining water levels, measuring pressures, measuring flow rates, time measurements, and uncertainties associated with the test equipment configuration.
- B Well construction and development errors including partial penetration of the screened interval through the permeable zone and incomplete development of the screen/filter pack.
- C Apparatus calibration errors including using flow or pressure measurement devices that are out of calibration or do not accurately account for pressure loss at the test zone.

Table 3-4
Public and Private Wells Within 3 Miles of MISS
(Excludes Monitoring Wells)

Page 1 of 8

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
1	26-03-216	26-2473	Arcola Country Club Paramus, NJ	O,R	1958	60(48-60)	10
2	26-03-216	26-2403	Barrett 276 Alpine Drive Paramus, NJ	D	1961	85(31-85)	50
3	26-03-218	-- ^b	Zechmeister Bros. Magnolia Avenue Maywood, NJ	O	1980	155(25-155)	25
4	26-03-229	26-4803	Coop Corp. Inc. 70 Passaic Street Bergen County, NJ	D	1979	150(61-150)	10
5	26-03-251	26-4491	Schlotterer 7 Lower Cross Rd. Saddle River, NJ	D	1972	125(59-125)	20
6	26-03-257	26-2687	Struble 32 MacKay Avenue Paramus, NJ	D	1962	120(38-120)	10
7	26-03-259(1) ^c	26-1093	Oscar Lucibello Route #4, Paramus, NJ	D	1955	173(42-173)	35
8	26-03-259(1)	26-750	Bijur Lubricating Corp. 151 W. Pasaic Street Rochelle Park, NJ	N	1953	175(61-175)	200
9	26-03-285(1)	26-3998	Mrs. Kakosh 54 Thiem Avenue Rochelle Park, NJ	R	1966	215(5-215)	40
10	26-03-289(1)	26-3874	Mrs. Minnie Butler 111 Rochelle Avenue Rochelle Park, NJ	D	1966	130(31-130)	30

Table 3-4
(continued)

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
11	26-03-293(1)	26-3215	Manero's 222 Route 17 Rochelle Park, NJ	O	1965	214(37-214)	72
12	26-03-293(1)	26-4917	Carretta Trucking Inc. 160 S. Route 17 Paramus, NJ	N	1980	125(38-125)	45
13	26-03-294(1)	26-2807	Ernest Dawal 110 Rochelle Avenue Rochelle Park, NJ	D	1963	100(25-100)	30
14	26-03-296(1)	26-1209	N.W. Stousland (Sandy's) Route 17 Paramus, NJ	D	1956	150(66-150)	50
15	26-03-296(1)	26-2241	J & H Label Co. 230 W. Pasaic Street Maywood, NJ	N	1960	125(20-125)	120
16	26-03-298(1)	26-2776	Frank & Joseph Alesso 214 Hemlock Avenue Point Pleasant, NJ	D	1963	100(23.11-100)	45
17	26-03-299(1)	26-4892	Janet Whitmaker 157 Magnolia Avenue Maywood, NJ	D	1980	155(25-155)	35
18	26-03-311	26-3497	Snell 89 East Hemlock Drive Paramus, NJ	D	1965	175(48-175)	20
19	26-03-316	26-4311	Mitchell 189 Fairview Avenue Paramus, NJ	D	1969	268(41-268)	22

Table 3-4
(continued)

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
20	26-03-347(1)	26-3834	Mr. Carman Costa Spring Valley Rd & W. Pleasant Avenue Maywood, NJ	D	1966	228(20-288)	45
21	26-03-354	26-3671	Blasko Locust Street Maywood, NJ	R	1966	103(47-103)	37
22	26-03-362	26-3659	Stewberg 401 Elm Avenue River Edge, NJ	D	1965	90(43-90)	10
23	26-03-381	26-3832	Kilian 121 Woodland Avenue Maywood, NJ	R	1966	70(55-70)	20
24	26-03-517	26-3855	Thompson 9th Street Saddle Brook, NJ	O	1966	93(16-93)	10
25	26-03-518	26-4905	Board of Education Mayhill Street Saddle Brook, NJ	P*	1980	200(80-200)	33.5
26	26-03-531(1)	26-359	Metalfab Woodland Avenue, Rte. 7 Rochelle Park, NJ	O	1951	103(19.6-103)	40
27	26-03-532(1)	26-3936	Snappy Car Wash T/A Jax Car Wash 107 Essex Street Maywood, NJ	N	1966	196(40-196)	20
28	26-03-535(1)	26-1025	Mr. Joseph Brizek 48 Woodland Avenue Rochelle Park, NJ	D	1954	100(15-100)	10

Table 3-4
(continued)

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
29	26-03-535(1)	26-2771	Aquarium Inc. 87 Route 17 Maywood, NJ	N	1963	300(22-300)	172
30	26-03-537(1)	26-4050	Alexander Buday 446 Saddle River Rd. Saddle Brook, NJ	R	1967	67(49-67)	30
31	26-03-541	26-5621	Ciappina 283 Outwater Lane Saddle Brook, NJ	D	1982	108(31-108)	40
32	26-03-542	26-3557	Stanley Kobaiarz 177 Market Street Garfield, NJ	D	1965	--	
33	26-03-541	26-5248	Murdock 318 Seventh St. Saddle Brook, NJ	D	1981	79(31-79)	35
34	26-03-551(1)	26-3526	Andrew Zientek 381 Samuel Avenue Garfield, NJ	D	1965	115(36-115)	20
35	26-03-556(1)	26-3527	James V. Failla 212 Market Street Garfield, NJ	D	1965	90(40-90)	25
36	26-03-556(1)	26-3529	Steve Kovacs, Sr. Samuel Avenue Garfield, NJ	D	1965	140(14-140)	20
37	26-03-559	26-3528	Bigoss Samuel Avenue Garfield, NJ	O	1965	100(30-100)	20

Table 3-4
(continued)

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
38	26-03-562(1)	26-825	Lodi Realty Corp. 165 Main Street Lodi, NJ	N	1953	105(26-105)	50
39	26-03-563(1)	26-787	Reisch Trucking & Trans. Palisades Park, NJ	N	1954	86(34-86)	50
40	26-03-563(1)	26-1356 26-1355	Lodi Shopping Center Essex St & Rte 17 Lodi, NJ	N	1956	301(20.7-301)	350
41	26-03-563(1)	26-2171	Lodi Shopping Center Essex St & Rte 17 Lodi, NJ	N	1960	300(22-300)	290
42	26-03-563(1)	26-3570	Jos L. Muscarelle Inc. 113 Essex Street Maywood, NJ	N	1966	400(32-400)	159
43	26-03-566(1)	26-130	The Interchemical Corp. P.O. Box 167 Hawthorne, NJ	N	1949	435(16.9-435)	187
44	26-03-566(1)	26-213	Frank Dini Co. Lodi, NJ	N	1950	200(32-200)	55
45	26-03-577	20-2067	Yoo-Hoo Beverage Co. 113 Farnham Avenue Garfield, NJ	N	1959	303(22-303)	95
46	26-03-598	20-5557	Torre 454 Blvd. Hasbrouck Hts., NJ	O	1982	230(30-230)	65
47	26-03-611(1)	26-3650	Henry Menzer 339 Golf Avenue Maywood, NJ	D	1966	170(34-170)	29

Table 3-4
(continued)

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
48	26-03-615(1)	26-5847	Malt Products Corp. 121 Hunter Avenue Maywood, NJ	O	1982	315(53-315)	300+
49	26-03-619(1)	26-5039	Players Club 40 Polifly Rd. Hackensack, NJ	D	1981	303(85-305)	30
50	26-03-621(1)	26-3952	Howard Mack 435 Summit Avenue Hackensack, NJ	D	1966	150(20-150)	35
51	26-03-637	20-2626	First Baptist Church Assoc Conklin Place Hackensack, NJ	O	1962	189(179-189)	200
52	26-03-639	26-5511	Teaneck Swim Club 700 Pomander Walk Teaneck, NJ	R	1982	218(121-218)	60
53	26-03-645(1)	26-4762	Kings Custom Molding Inc. 194 Daniel Street Hackensack, NJ	N	1979	186(43-186)	50
54	26-03-665	26-4199	Peoples Trust Co. Salem & Moore Sts. Hackensack, NJ	--	1968	660(240-660)	20
55	26-03-667	26-819	Food Fairstores, Inc. Morris & River Sts. Hackensack, NJ	--	1954	525(270-525)	55
56	26-03-673	26-4815	Faustini 604 Elm Street Maywood, NJ	O	1980	110(31-110)	25
57	26-03-816	26-3914	Amato 232 Springfield Avenue Hasbrouck Heights, NJ	R	1966	160(24-160)	10

Table 3-4
(continued)

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
58	26-03-822	26-5848	Daub 188 Woodside Avenue Hasbrouck Heights, NJ	D	1982	162(31-162)	32
59	26-03-822	26-4953	Van Hook Ottawa Avenue Hasbrouck Heights, NJ	D	1981	98(31-98)	28
60	26-03-823	26-5023	Janiero 22 Ottawa Avenue Hasbrouck Heights, NJ	D	1981	112(21-112)	35
61	26-03-823	26-5013	Mitchell 117 Patterson Avenue Hasbrouck Heights, NJ	D	1981	118(25-118)	30
62	26-03-826	26-5307	Krisco 165 Bell Avenue Hasbrouck Heights, NJ	D	1981	150(32-150)	30
63	26-03-827	26-3525	Komsa 116 Prospect Street Garfield, NJ	D	1965	100(18-100)	10
64	26-03-829	26-5727	Postman Passaic Street Hasbrouck Heights, NJ	D	1982	202(31-202)	22
65	26-03-836	26-5123	Imken 186 Berkshire Rd. Hasbrouck Heights, NJ	D	1981	198(33-198)	25
66	26-03-864	26-5412	Cosmos Diner, Inc. 211 Route 17 Hasbrouck Heights, NJ	O	1981	167(121-167)	40

Table 3-4
(continued)

Page 8 of 8

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
NO ATLAS COORDINATES AVAILABLE							
67	--	26-3655	Abrams 5 Fairway Maywood, NJ	D	1965	144(21-144)	20
68	--	--	Artesian Well & Pump 21 Lexington Rochelle Park, NJ	R	1965	165(20-165)	30
69	--	26-3558	Azzolino 59 Union Street Lodi, NJ	O	1965	60(20-60)	25
70	--	--	Bryening 222 Stone Street Maywood, NJ	O	1966	100(20-100)	20
71	--	26-4079	Grasso Westervelt Place Lodi, NJ	D	1967	70(30-70)	10
72	--	26-4003	Hrubec 400 Dewey Avenue Saddle Brook, NJ	R	1966	100(26-100)	35
73	--	26-5333	Mancini 115 Forest Avenue Rochelle Park, NJ	D	1981	113(46-113)	25
74	--	--	Topinka 43 Woodland Avenue Rochelle Park, NJ	O	--	--	--

Source: New Jersey Department of Environmental Protection, Division of Water Resources, Bureau of Water Allocation.

^a* = Well currently not in use.

D = domestic

Table 3-4
(continued)

Page 9 of 8

ID No.	New Jersey Atlas Coordinates	New Jersey Permit No.	Owner/Address	Use ^a	Date Constructed	Depth - Open Interval (Ft)	Yield (gpm)
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N = industrial
R = irrigation
P = public water supply
O = other

^b-- = not available

^c(1) = Wells located within approximately 1 mi of MISS. Locations shown in Figure 3-28.

4.0 NATURE AND EXTENT OF CONTAMINATION

Data from the RI, historical investigations, and DOE's routine environmental monitoring program have been used to develop an understanding of the nature and extent of the radioactive and chemical contamination at the Maywood Site for which DOE is responsible under the terms of the FFA. An understanding of the data will allow informed decisions to be made concerning the level of risk at the site and the appropriate type of remedial action.

4.1 INTRODUCTION

The identification, concentrations, and spatial distributions of contaminants at the Maywood Site are described in this section.

Soil contamination is characterized based on RI sampling and analysis data, review of past thorium processing and waste disposal practices, and review of previous studies and surveys. Data collected during DOE's routine environmental monitoring program from the fourth quarter of 1990 through the third quarter of 1991 were used to characterize contamination in surface water, sediments, groundwater, and air.

The sections that follow discuss the definition of FUSRAP waste (Section 4.2), radioactive and chemical contaminant sources (Section 4.3), and the results of sampling and analysis to determine contaminant impacts on the Stepan property (4.4), MISS (4.5), residential vicinity properties (4.6), and commercial/governmental vicinity properties (4.7). Data are summarized for each operable unit, and figures are provided to show sampling locations for the various media. Appendixes C through F contain complete survey and analytical data for soil. Groundwater at MISS is treated as a separate operable unit (4.8). Environmental monitoring results for surface water, sediments, and air are discussed in Sections 4.9, 4.10, and 4.11, respectively.

The analytical database for the RI is comprised of radiological and chemical categories. The radiological data include analytical results for thorium-232, radium-226, uranium-238, radon, and thoron. The chemical data include results of analyses for metals,

rare earth elements, VOCs, BNAEs, PCBs, TCLP compounds, mobile ions, corrosivity, and reactivity. Parameters for radiological analysis were selected based on knowledge and reconstruction of the thorium extraction process, NRC records and other historical data, and reviews of previous radiological surveys. Chemical sampling parameters for the interim storage pile were established by NJDEPE to enable that agency to adequately classify the waste. Sampling parameters for MISS and vicinity properties were selected based on NJDEPE requirements established for the interim storage pile.

4.1.1 Radioactive Contaminants

All soil, water, and sediment samples collected as part of the RI were analyzed for uranium-238, radium-226, and thorium-232. To confirm background concentrations in soil, surface soil samples were collected from three locations in the Maywood area and analyzed for the same radiological parameters. These locations, Foschini Park, Rochelle Park, and Borough Park-Maywood (Figure 4-1), were selected based on their proximity to MISS and the belief that they are representative of the Maywood Site. Analytical results for these background samples are shown in Table 4-1.

Radiological data for liquid samples are reported in picocuries per liter (pCi/L). For soil samples, the radiological units are picocuries per gram (pCi/g). These units measure radioactivity per unit volume (for liquids) or mass (for solids) of material for a specific radionuclide or group of radionuclides which emit alpha, beta, or gamma radiation. In reporting radiological results, use of the "less than" (<) notation indicates that the radionuclide was not present at concentrations measurable by the instruments and techniques used. The "less than" value represents the lower limit of the quantitative capability of the instrument and technique utilized and is based on various factors, including the volume, size, and weight of the sample; the detector type; the counting time; and the background count rate. The concentrations of the radionuclides are actually less than the values indicated. In addition, because radioactive decay is a random process, a

correlation between the rate of disintegration and a given radionuclide concentration cannot be precisely established. For these reasons, the exact concentrations of the radionuclides cannot be determined. Therefore, each value that can be quantitatively determined has an associated uncertainty term (\pm), which represents the amount by which the actual concentration can be expected to differ from the value reported. Radiological data are therefore reported with an accompanying uncertainty factor that accounts for uncertainties in the analytical process. The uncertainty factor represents a statistical value that is equivalent to two standard deviations of the sample's reported activity. By adding the uncertainty factor to the reported value to determine the upper limit, and by subtracting the uncertainty factor from the reported value to obtain the lower limit, a computed range of values can be determined that has a 95 percent probability of containing the true value. If the uncertainty factor is greater than the reported value, the activity is statistically indistinguishable from zero and can be considered nondetectable. If the radiological result is reported without an uncertainty factor, the result is at the minimum detectable activity (MDA), and the actual activity is some value less than the MDA.

Thorium-232 occurs naturally at high concentrations in monazite sands (the raw feed material at Maywood); therefore, it is the primary contaminant at the site and is the radionuclide most likely to exceed the DOE guideline for radionuclides in soil. Parameters for analysis of soil samples were selected to ensure that thorium-232 would be detected and measured at concentrations well below the lower guideline value of 5 pCi/g above background. Uranium-238 and radium-226 also occur naturally in monazite sand, but at lower concentrations than thorium-232. Therefore, these radionuclides (considered secondary contaminants) would generally not be present at concentrations in excess of guidelines unless concentrations of thorium-232 exceeded criteria. Because of the relatively low gamma photon abundance of uranium-238, many of the uranium-238 concentrations were below the detection sensitivity of the analytical procedure; these concentrations are reported in the data tables as "less than" values. To obtain more accurate results for uranium-238 with these analytical methods, much longer instrument counting times would be required than were necessary for analysis of thorium-232.

Five percent of all soil samples analyzed for uranium-238, radium-226, and thorium-232 were also submitted for isotopic analysis to determine whether secular equilibrium exists between thorium-232 and its daughters in contaminated soils at the Maywood Site. Samples were selected at random for isotopic analysis from each operable unit except MISS. Fifty-four samples, representative of the sampling conducted at the Maywood Site, were selected. Table 4-2 presents the results of isotopic analyses.

Secular equilibrium is generally not observed in samples from burial pit areas and areas that are known to contain process waste material. This disequilibrium is expected because of the removal of thorium-232 from the original feed material at MCW. In areas where the contaminated waste material is believed to consist of unprocessed monazite sand residues (either spilled during transfer or transported via surface water runoff), isotopic analysis indicates that thorium-232 and its daughters are in secular equilibrium.

Although a small number of samples were not in equilibrium, all

contained progeny of the thorium-232 and uranium-238 decay series.

It has therefore been concluded that because all samples were analyzed for uranium-238, radium-226, and thorium-232, all radionuclides of interest at the Maywood Site were detected. Radiological data for soil samples collected from the operable units are presented in Appendixes C, E, and F.

Throughout the discussion of each operable unit, figures are provided to illustrate the location and extent of surface and subsurface radioactive contamination. These areas of contamination have been determined based on the results of near-surface gamma walkover surveys, surface and subsurface sampling and analysis, and downhole gamma logging. The boundaries of contamination are conservative (i.e., they were drawn so as not to underestimate the extent of contamination). Therefore, areal boundaries of contamination shown in the figures extend beyond the location of a contaminated sample, half the distance to the location of an uncontaminated sample. Data from gamma walkover surveys were also used to estimate contamination boundaries. Summary maps were constructed based on downhole gamma logs from all investigations; small-scale versions of these maps are included at the end of the section (Figures 4-2 through 4-8). The extent of contamination shown in these figures is slightly different from that shown in the full-size versions. Boundaries shown in these figures are drawn close to data points; areas where no data are presented are assumed not to be contaminated.

4.1.2 Chemical Contaminants

Chemical analyses of soil, groundwater, surface water, and sediment samples were performed to identify chemical contaminants that are associated with the thorium processing operations at MCW and to determine whether radioactive waste is mixed with RCRA-characteristic waste, whether chemical contaminants are present at MISS, and whether chemical contaminants have migrated from MISS. DOE is responsible for cleanup of both radioactive and chemical contaminants existing on or migrating from MISS, regardless of origin. Under the terms of the FFA, DOE is also

responsible for chemical contaminants that originated from the thorium processing operations and for chemical contaminants that are commingled with radioactivity at the other operable units. The following sections report chemical analytical results for all operable units evaluated during the RI, regardless of DOE responsibility. Significant findings documented during the analytical process are summarized for each operable unit. Complete chemical data for soil samples are presented in Appendixes C through F.

Chemical data for liquid and leachate samples are presented in concentration units of micrograms of the analyte per liter of liquid ($\mu\text{g/L}$). For soil and sediment samples, the chemical data are presented in micrograms of analyte per kilogram of solid ($\mu\text{g/kg}$) or milligrams of analyte per kilogram of solid (mg/kg). Both 1 $\mu\text{g/L}$ and 1 $\mu\text{g/kg}$ are equivalent to one part per billion (ppb); 1 mg/kg is equivalent to one part per million (ppm).

QC samples were analyzed to evaluate data quality for completeness, comparability, representativeness, precision, and accuracy. Trip blanks were prepared at a frequency of one per day when aqueous VOCs were collected. Field blanks and field duplicates were collected at a frequency of 5 percent of the field samples or a minimum of one for all matrices. Method spikes, matrix spikes, standard reference materials, laboratory duplicates, replicates, and method blanks were all collected at a frequency that met Contract Laboratory Program (CLP) requirements. Samples were identified and chain-of-custody protocol was maintained from collection to analysis and disposition of samples to ensure positive control. Quality control procedures are discussed further in Appendix I.

An overview of the proposed quality assessment procedure for radiological and chemical data is presented in the quality assurance project plan for the Maywood Site (BNI 1990d). After radiological samples were analyzed, results were reviewed for precision, accuracy, completeness, and representativeness. Upon successful completion of the quality assurance/quality control (QA/QC) process, data were included in the overall site database.

QC samples were used to assess data quality in terms of precision and accuracy and to document that sampling and analysis procedures did not introduce variables that could render the data questionable. QC samples were regularly prepared in the field and the laboratory and analyzed to ensure that all phases of sampling and analysis were controlled. These samples included field blanks and duplicates, method blanks and spikes, matrix spikes and duplicates, laboratory duplicates, and standard reference materials. The guidance documents used in the assessment and qualification of chemical data are Laboratory Data Validation: Functional Guidelines For Evaluating Organic Analyses (EPA 1988d) and Laboratory Data Validation: Functional Guidelines For Evaluating Inorganic Analyses (EPA 1988e).

Representative background/baseline concentrations

To evaluate the extent of contamination resulting from activities associated with the former MCW and its impact on the surrounding environment, samples were taken to represent background (or uninfluenced, undisturbed conditions) for all potential migration pathways that would be representative of conditions at the Maywood Site. Samples were analyzed for radioactive and chemical contaminants to determine the incremental contribution of each contaminant that was known to exist, or potentially could have existed, at MCW. Background gamma exposure rate measurements, background concentrations of radon and thoron in ambient air, background radionuclide concentrations in soil, and background radionuclide concentrations in surface water and groundwater were determined from several locations. Representative background soil and water samples were also analyzed to determine background concentrations of metals, rare earth elements, pesticides, and PCBs. Although no volatile or semivolatile organic compounds exist in nature, samples were collected from the same background sampling locations to provide a baseline for evaluation of MCW's incremental contribution of these contaminants.

Soil samples that are representative of background conditions for the Maywood Site were collected from four locations at Borough

Park in Maywood (Figure 4-1). The park is located in a highly developed residential area that is also near industrial areas of the borough. Sampling locations were selected on the basis of proximity to the Maywood Site, relative independence from potential impact by the site, and representativeness of area land uses.

Analytical results for background sampling locations (presented in Appendix K and summarized in Tables 4-3 through 4-6) were compared with the results of sampling and analysis for chemical constituents in soil at each of the operable units investigated during this RI. Analytical results for soil at each of the four operable units are presented in following sections; complete chemical analytical data are found in Appendixes C through F.

Although several contaminants were not specifically discussed in this document (either because they are below background, representative, or comparative baseline concentrations; because they are below detection limits; or because they are not included in the definition of FUSRAP waste), all data are included in the appendixes to this report.

Summary tables at the end of this section present concentration ranges identified during the radiological and chemical evaluation of soil samples collected during the RI. Tables summarizing chemical and radiological data from the environmental monitoring program are also presented and referenced to the most recent annual site environmental report (BNI 1991a). Data are grouped according to operable unit and contaminant type (i.e., radiological or chemical).

4.2 DEFINITION OF FUSRAP WASTE

Under the terms of the FFA, DOE is responsible for cleanup of FUSRAP waste, which, as defined in the FFA, is specifically limited to:

- All radioactive and chemical contamination, whether commingled or not, occurring on the DOE-owned MISS
- All radioactive contamination exceeding DOE action levels

and related to thorium processing at MCW, occurring on a vicinity property

Nonradioactive chemical contamination that occurs on vicinity properties is DOE's responsibility if the contamination meets either of the following conditions:

- The contamination is mixed or commingled with radioactive contamination that exceeds DOE action levels, or
- The contamination originated at the DOE-owned MISS or was associated with specific thorium manufacturing or processing activities at MCW that resulted in the radioactive contamination.

Based on the definition in the FFA, the following criteria were developed during this RI for classification of a detected constituent as FUSRAP waste:

- The contaminant is a known constituent of the thorium feed material (monazite sands) processed at MCW
- The contaminant is a known constituent of the thorium extraction process performed at MCW
- The contaminant is commingled with radioactive contamination that exceeds DOE action levels
- The contaminant is detected on MISS at concentrations exceeding naturally occurring concentrations, or is detected in surface water, sediment, or groundwater at concentrations indicating potential migration from MISS

Several metals that were detected (e.g., calcium, potassium, and sodium) were not classified as FUSRAP waste because of the variability of their natural occurrence in the earth's crust and

their relative abundance in undisturbed soils. The baseline risk assessment, which will be published under separate title at a later date, will evaluate all contaminants found at the site, regardless of location or inclusion in the definition of FUSRAP waste.

The feed material for the thorium extraction process at MCW was monazite sand. Monazite is fundamentally a phosphate of cerium and lanthanum, in which thorium and the yttrium earths substitute for cerium and lanthanum. The usual accepted chemical formula for monazite is $(Ce,La,Y,Th)PO_4$. In addition, most deposits of monazite sand include small to moderate amounts of ferric iron, aluminum, calcium, magnesium, silicon, titanium, and zirconium (Cuthbert 1958). The most common rare earth constituents of the monazite sands used in thorium processing operations are cerium, lanthanum, and dysprosium. The U.S. Geological Survey has determined that praseodymium, neodymium, samarium, and gadolinium are also present in domestic monazite at 5.1, 19.2, 4.0, and 1.9 percent, respectively (Gillson 1960). The rare earth elements most frequently detected during this RI were cerium, lanthanum, and neodymium; other rare earth elements were detected with varying frequency. Generally, the rare earths detected during the RI are collocated with radioactive contamination.

In the early 1940s, after it was recognized that thorium was a potential source of fissionable material, reserves and inventories of thorium and thorium-bearing ores (including monazite sand) were classified as source material under the Atomic Energy Act of 1946.

From that time until July 1, 1955, thorium production was classified by the AEC, and statistics were not released. Since 1955, the statistical compilation of records of private sales and purchases of thorium-bearing ores has been discontinued, although under agreements with foreign countries, most import data remain classified. It is not known, therefore, whether the origin of the monazite sands processed at MCW was Brazilian, Indian, or domestic (Idaho, Florida, or Carolina sands). All monazite sands are similar in composition, but regional variations are evident.

Rough mechanical concentration of the monazite ore to remove light sands was followed by fine separation by either gravitational, electromagnetic, or electrostatic separation

techniques. Table 4-7 summarizes the composition of monazite sands from various regions after the ores were concentrated. The ranges of values are somewhat misleading; the extreme values prevent accurate, straightforward comparison of the composition of monazite sands typical of different regions. Although the relative percentages for unconcentrated ores would be different, ratios of the various constituents would be expected to fall within the range of those observed in the concentrated material. In addition to thorium, monazite sands also contain uranium, but rarely at concentrations that are economically feasible to process for the uranium content alone. In older methods used to process monazite by digesting with sulfuric acid (similar to the process used at MCW), the uranium is not readily recoverable because it is dispersed throughout the various process effluent fractions.

Certain heavy metals and analogue elements are known to be associated with uranium ores (Dreesen et al. 1982). These metals are listed below.

Metals Present in Uranium Tailings

Uranium Analogue Elements	Arsenic, molybdenum, selenium, vanadium
Heavy Metals	Cobalt, copper, nickel, lead

Monazite sands, considered a secondary uranium ore, differ chemically from other uranium ores primarily in their lack of substantial concentrations of cobalt, molybdenum, and vanadium. The presence of uranium analogue elements and other heavy metals, particularly in areas of radioactive contamination, suggests that monazite sand may not have been the only material processed at MCW.

This is a reasonable assumption, given the fact that the property was the site of an active chemical plant for approximately 80 years.

This study acknowledges the potential occurrence of constituents of monazite sands and minor quantities of other feed material as nonradioactive contaminants at the Maywood Site. Uranium is an elemental component of monazite sands (substituted for thorium in trace amounts), and some of the analogue elements

associated with uranium ores are therefore identified as constituents of FUSRAP waste as defined by the FFA. The occurrence of nonradioactive (chemical) constituents actually contributed by MCW thorium processing would be expected to occur offsite only in areas of radioactive contamination. This conclusion is based on the fact that the extraction process believed to have been used at MCW was inefficient in removing thorium (as well as uranium and radium) and would have resulted in process tailings (waste) that still contained substantial quantities of radioactive material.

4.3 CONTAMINANT SOURCES

Historical records and data from previous radiological and chemical characterization activities were reviewed to identify contaminant sources at the Maywood Site (see Section 1.4). The primary sources of contamination identified were (1) burial pits at Stepan, (2) former retention ponds and mounds of solid material on the MISS, Sears Distribution Center, and Ballod properties, and (3) the interim storage pile at MISS.

The following sections describe primary and secondary contaminant sources related to the Maywood Site, presenting information on location, approximate volume, principal constituents, and potential migration pathways. Discussion is limited to contaminants and sources for which DOE has responsibility under the FFA (see Section 4.2).

4.3.1 Primary Sources

The primary sources of contamination at the Maywood Site, identified from historical information, are those areas where contaminated waste materials are known to have been consolidated. Radioactive constituents (e.g., thorium-232, uranium-238, and decay products) are the primary contaminants that DOE must address under its responsibilities as defined by the FFA.

Burial pits

The three burial pits shown in Figure 4-9 are the primary sources of contamination on the Stepan property. The burial pits were constructed after radiological surveys conducted between 1963 and 1968 indicated that a tailings pile and a slurry pile, located west of Route 17 on what is now the Ballod property, contained radioactive materials (Jones 1987). The materials from these piles were subsequently excavated and buried in unlined burial pits 1, 2, and 3 on the Stepan property. In 1966, 6,400 m³ (8,400 yd³) of this radioactive waste was placed in burial pit 1; in 1967 and 1968, 1,600 m³ (2,100 yd³) was placed in burial pit 2, and 6,600 m³ (8,600 yd³) was placed in burial pit 3. The buried wastes remain in these locations (NRC 1981a).

NRC records indicate that the waste placed in burial pits 1 and 2 contained a total of 980,640 kg (2,160,000 lb) of thorium waste material that is 1.5 percent thorium phosphate, which occupies approximately 1,530 m³ (2,000 yd³). The total quantity of thorium is therefore approximately 8,100 kg (17,840 lb) containing approximately 880 mCi of thorium-232. NRC records do not specify the amount of waste in burial pits 1 and 2 but provide a combined total. Of the 6,600 m³ (8,600 yd³) of waste in burial pit 3, records indicate that approximately 2,300 m³ (3,000 yd³) contains approximately 0.25 percent thorium, which yields approximately 3,700 kg (8,150 lb) of thorium containing about 400 mCi of thorium-232 (NRC 1981d).

Specific information concerning the size and depth of burial pits 1 and 2 is not contained in NRC records, although hand-drawn sketches are included. However, a detailed description of the construction of burial pit 3 is contained in an August 1981 NRC license amendment. Burial pit 3 was constructed of five trenches as described below:

<u>Trench Identity</u>	<u>Dimensions of Trench (ft)</u>	<u>Approximate Volume of Buried Waste (yd³)</u>
3-1	90 x 90 x 10	3000
3-2	150 x 25 x 13	2000
3-3	107 x 26 x 15	1520
3-4	96 x 27 x 13	1250
3-5	117 x 24 x 8	830

These trenches were excavated 2.4 to 4.0 m (8 to 13 ft) deep from grade to the depth of a shale and rock base. The excavations were observed to be free of water (Stepan 1981).

The principal FUSRAP waste constituents in the burial pits are radioactive constituents. Thorium-232 and its decay products, with lesser amounts of the uranium-238 decay chain, are the primary contaminants of interest because natural thorium was a direct product of the thorium processing operations at MCW and was a component of the original monazite sands used as feed material. Historical information about the thorium processing operations at MCW indicates that no organic contaminants were introduced during processing. Purification of thorium by solvent extraction was not performed at MCW because the technology was not established until 1958 (Teh et al. 1983). Therefore, the primary chemical contaminants detected are constituents of monazite sands, primarily rare earth elements and other metals that may have been extracted along with thorium. The chemical contaminants associated with the original monazite sands were identified during this RI and are discussed in Sections 4.4 through 4.7.

Because the burial pits were not lined with a synthetic liner, the potential for migration exists. However, the burial pits lie beneath buildings, asphalt, or vegetation, and the waste deposited in these pits was covered to a depth of 0.9 to 1.2 m (3 to 4 ft) with clean fill material. Because the burial pits are covered, the migration potential via surface water and sediment deposition is low. The most likely mechanism for migration would be through the groundwater system. Data collected to date from routine monitoring of surface water, sediments, and groundwater at the MISS and Stepan properties are inconclusive as to whether migration of contaminants from the burial pits is occurring via groundwater. An addendum to the field sampling plan has been prepared that includes installation of additional wells in order to better determine the extent of contaminant migration via groundwater.

The current environmental monitoring program at the Maywood Site consists of annual groundwater and surface water sampling for nonradiological parameters (i.e., TOC, TOX, TPH, VOCs, BNAEs, TAL

metals, pH, and specific conductance). Sediments are also sampled annually for nonradiological parameters (i.e., TPH and TAL metals).

Radiological sampling of groundwater, surface water, and sediments is performed biannually. Samples are analyzed for total uranium, thorium-232, radium-226, and radium-228. In addition, external gamma radiation levels and radon/thoron concentrations in air are monitored throughout the year.

Former retention ponds

The former retention ponds were constructed by MCW as earthen dikes to hold a process slurry effluent containing thorium processing wastes (Cole et al. 1981). MCW also reportedly placed waste from other process operations in the retention ponds. A photographic analysis of the former MCW published by EPA in May 1984 (Mata 1984, TS-PIC-84023) specifically identified areas of standing liquids, mounds of material, bare or graded ground, drums, tanks, and other features that could potentially represent sources of contamination. This analysis was referenced during the preparation of maps that present the thickness of fill material at the site (see Section 4.4.2). The photographs were also used to delineate boundaries of waste holding areas, retention ponds, and fill areas where little or no subsurface data were available. Subsurface radiological and geological data from borings performed during the RI (BNI 1987a) indicate that the retention ponds were located on what is currently the MISS, Sears Distribution Center, and Ballod properties (Figure 4-9).

Six retention ponds were constructed between 1940 and 1983 (Figure 4-10). The earliest photograph (1940) shows that two retention ponds (D and E), located on what is now the Ballod property, and pond C, located on what is now the DOE-owned MISS property, were active. Two small lagoons can be seen in the southwestern portion of what is now the Stepan property, and one is visible on the western portion of what is now the Sears Distribution Center property. These lagoons are not visible in later photographs of the area. By 1951, photographs indicate that ponds D and E on the Ballod property were not in use. Pond C

(MISS) was still in use and had been slightly enlarged. Photographs show that ponds A and B had been constructed and were in use by 1951.

By 1954, ponds D and E on the Ballod property showed indications of revegetation. Ponds A and C (on MISS) were still active, and pond B had been enlarged to nearly its maximum extent.

Pond F on the northern portion of the Sears Distribution Center property had been constructed and appeared to contain standing liquids.

Photographs show that ponds A, B and C were still active in 1961; the eastern side of pond A was being filled with solid materials. Pond F on the Sears Distribution Center property had been expanded, and two areas of standing liquids were visible. Some activity at the Ballod property was apparent, but it did not appear to involve disposal of waste material.

Disposal of liquids had apparently ceased by 1965, and all of the retention ponds appeared to be in various stages of revegetation. In a 1970 photograph, the outlines of the retention ponds were barely visible at MISS. Pond D at the Ballod property had been cleared and appeared as bare earth. By 1974, all activity associated with the ponds had ceased, and the outlines of the retention berms were obscured by vegetation or disposal of solid materials.

During a removal action conducted by DOE in 1984 and 1985, most of the radioactive material from former retention pond locations on the Ballod property was placed in interim storage on MISS (BNI 1986b).

The exact volume of the former retention ponds is unknown; however, the volume of contaminated material at MISS is estimated to be 105,000 m³ (137,000 yd³), including contaminated material in the interim storage pile and other contaminated soils on the property. MISS and the Sears Distribution Center property are the only properties on which unremediated former retention pond locations exist; all retention pond areas on the Ballod property have been remediated (BNI 1986b). One of the retention ponds at MISS reportedly held primarily lithium wastes; another contained both thorium and lithium wastes (NRC 1981a).

The principal contaminants in the former retention ponds are radioactive. Other chemical contaminants may be present, assuming that wastes from other MCW operations were placed in the ponds. Although the retention ponds are no longer active and are now covered by fill material, vegetation, and artificial surfaces, potential contaminant migration pathways exist. These include surface water runoff, sediment deposition, and leaching into the groundwater system. DOE's routine monitoring program has identified the presence of lithium in surface water. For over 100 years, the Maywood Site has been a highly industrialized area; it is difficult to determine the contribution of individual source areas (such as the former retention ponds) to groundwater contamination in the area. Localized chemical contamination in groundwater has been identified both upgradient from the retention ponds (on Stepan Company property) and downgradient from the former retention ponds.

Former locations of mounds of materials

Between 1940 and 1983, materials were deposited in mounds across the MISS property (Figures 4-11 through 4-14). Photographs show mounds of material located primarily in the northwestern portion of the MISS property, north of the railroad spur. The mounds generally occupied a small area [maximum of 30.48 by 30.48 m] (100 by 100 ft) between retention ponds A and B in the eastern end of pond A and along the railroad spur, both on MISS and the western end of the Stepan property. From 1940 through 1961, small mounds [15.24 by 15.24 m (50 by 50 ft) or smaller], were also located in the extreme southwestern corner of the MISS property, along the southern boundary of the Stepan property, and in the western portion of the Sears Distribution Center property. These disposal areas are described below.

- Disposal area 1 (Stepan) appeared to have been filled prior to 1940, and no significant activity was observed in later photographs.

- Disposal area 2 was dug, filled, and closed between 1970 and 1974.
- Disposal area 3 (Stepan) received material from 1940 to 1974. By 1983, photographs show that a building had been constructed in this area.

Photographs show other mounds of solid material along the western portion of the Sears Distribution Center in 1965, on the Ballod property in 1974, and south of the railroad on the MISS property from 1965 to 1970. In 1965, a large mound of material was also present in the central area of MISS in the vicinity of the present storage pile. Two large areas of material (possibly sludge) along the northern property line of MISS can be seen in a 1974 photograph. Two large mounds of material that were located in the central portion of the Stepan property in 1974 were probably composed primarily of construction debris from the extensive demolition activities that occurred between 1970 and 1974.

Storage pile at MISS

The interim storage pile at MISS (Figure 4-9) was constructed as an interim containment for wastes removed during cleanup of vicinity properties. After the ground was leveled and packed, a 15-cm (6-in.) layer of sand was placed on the ground, followed by a synthetic geomembrane (Hypalon®) bottom liner and an additional 15-cm (6-in.) layer of sand. Contaminated materials removed from vicinity properties were then added and covered with another Hypalon® liner. The top and bottom Hypalon® liners were sealed together to prevent contaminated materials from escaping. A leachate collection system was also installed; all leachate from the pile is collected, sampled, analyzed, and disposed of offsite by a licensed waste hauler. No leachate has contained radioactive contamination above DOE guidelines. A berm was installed around the entire storage pile to control runoff. The interim storage pile on MISS currently contains approximately 27,000 m³

(35,000 yd³) of contaminated materials generated from the cleanup of 25 vicinity properties, including waste from the former retention ponds on the Ballod property.

Although the storage pile was engineered, designed, and constructed in a manner to preclude the release of contaminants into the surrounding environment, a catastrophic failure of its components could cause it to become a primary source of contamination. The principal contaminants in the pile are the same radioactive constituents present in the burial pits and former retention ponds. The chemical contaminants are those associated with the original monazite sands and those associated with waste materials placed in interim storage. These were identified during this RI and are discussed in Section 4.5.

Potential migration pathways resulting from a catastrophic failure of the engineered containment system may include surface water (runoff and waste material deposition) and air [particulate dispersion or gaseous emissions (e.g., radon)]. Failure is highly unlikely, but the pile is considered a potential primary source because the waste materials have been consolidated, thereby increasing the levels of radioactivity. DOE conducts routine environmental monitoring of MISS (including all media identified as potential migration pathways) to ensure that the integrity of the containment system is maintained. No releases from the pile have been identified.

4.3.2 Secondary Sources

Secondary sources are identified as areas of contamination that do not contain consolidated or concentrated waste materials, such as buildings, areas of the Stepan property where process residues were placed, and soils on individual properties.

Buildings were determined not to be primary sources of contamination because surveys at MISS, the Sears Distribution Center property, and the New Jersey Vehicle Inspection Station indicated that contamination was underneath rather than inside the buildings (NRC 1981a,b; Morton 1982; BNI 1987a,c,g). Although some buildings at Stepan have residual radioactivity on structural

surfaces, the contamination is fixed (i.e., not easily removed) and is not considered to be a primary source for migration of contaminants.

Radioactive contamination at relatively low concentrations has been found extensively in soils of the properties that comprise the Maywood Site. However, such contamination does not represent a concentrated primary source of potential contaminant migration. This conclusion is substantiated by groundwater, surface water, and sediment monitoring, which has shown that contamination is not migrating from soil into the other media (see Sections 4.4 through 4.8).

Contamination in surface soils migrated via Lodi Brook (surface water drainage and sediment deposition) onto vicinity properties. The source of this contaminant migration is most likely the former retention ponds on the MISS, Sears Distribution Center, and Ballod properties. Also, the use of thorium-containing waste as fill material and/or mulch was a mechanism for contaminant deposition on vicinity properties. Properties that comprise the Maywood Site are highly developed, and the vast majority of the surface area is covered by buildings, asphalt, concrete, vegetation, or other materials that greatly limit the potential for additional contaminant migration.

4.4 SOIL, STEPAN PROPERTY OPERABLE UNIT

Sections 4.4 through 4.7 describe the nature and extent of radioactive and chemical contamination in near-surface and subsurface soils for each of the operable units. The suspected sources of contaminants, as outlined in Section 4.3, include burial areas, former retention ponds, historical waste management areas, and contaminated soil. The methodology of the investigation that led to this determination is defined in the field sampling and QA plans (BNI 1990c, 1990d) and is summarized in Section 2.0.

The objectives for the Stepan property operable unit, as outlined in the field sampling plan, were:

Objective 1: Determine extent of surface radioactive

- contamination
- Objective 2: Determine horizontal and vertical boundaries of subsurface radioactive contamination
 - Objective 3: Identify chemical contaminants resulting from thorium-232 processing operations
 - Objective 4: Determine whether hazardous waste is mixed with radioactive waste
 - Objective 5: Determine whether relocated and reburied process wastes have migrated from burial areas
 - Objective 6: Confirm that measurements obtained during previous surveys for fixed and removable contamination within buildings are valid
 - Objective 7: Confirm that gamma exposure rate measurements obtained during previous surveys within buildings and over outdoor surfaces are valid

The following sections describe how the objectives for the Stepan property operable unit were accomplished during the RI effort. Radiological and chemical sampling activities are described. Also included are a summary of data collected for the operable unit and a description of the locations of radioactive and chemical contaminants on the property.

4.4.1 Evaluation of Radioactive Contaminants

Surface measurements

Near-surface gamma radiation measurements on the Stepan property ranged from 5,000 to 600,000 cpm. Measurements were made using an unshielded gamma scintillation detector with a 5- by 5-cm (2- by 2-in.) NaI(Tl) probe. The average background value for the Maywood area is 7,500 cpm (Bradshaw 1990). A measurement of 11,000 cpm using a coneshielded gamma scintillation detector is approximately equal to the DOE guideline for thorium-232 of 5 pCi/g above background (background in soil is 1 pCi/g) for surface soil contamination. The shielded detector was calibrated at the Technical Measurements Center (TMC) in Grand Junction, Colorado, to

provide a correlation of counts per minute to picocuries per gram.

Using this correlation, near-surface, coneshielded gamma measurements were used to determine the extent of surface contamination and to select soil sampling locations.

Surface soil samples collected from 238 locations (shown in Figure 4-15) were analyzed for uranium-238, radium-226, and thorium-232. Concentrations in these samples ranged from <1.5 to <50 pCi/g for uranium-238, from <0.4 to 130 pCi/g for radium-226, and from <0.4 to 380 pCi/g for thorium-232. Complete analytical results are provided in Table C-1 (Appendix C). Figure 4-16 shows areas of surface contamination that exceed the DOE guideline, based on evaluation of near-surface gamma radiation measurements (see Figure 4-16a) and analytical results for surface soil samples. Because single data points are used to define them, the size of the smaller areas in Figure 4-16 may be underestimated.

Subsurface measurements

Gamma logging was performed and soil samples were collected from 237 boreholes drilled on the Stepan property (Figure 4-10). Analytical results for subsurface soil samples are presented in Table C-1 (Appendix C). Gamma logging data are presented in Table C-2; the results range from 3,000 to 1,199,000 cpm. (A measurement of 30,000 cpm is approximately equal to the DOE guideline of 15 pCi/g above background for thorium-232 in subsurface soil.) Analyses of subsurface soil samples collected at depths below 15 cm (6 in.) indicated uranium-238 concentrations ranging from <1.4 to 170 pCi/g, radium-226 concentrations ranging from <0.2 to 333 pCi/g, and thorium-232 concentrations ranging from 0.2 to 1,592 pCi/g. Areas of subsurface contamination are shown in Figure 4-18. The highest concentration of thorium-232 (1,592 pCi/g) occurred in borehole R167, located in burial pit 1. Contamination in burial pits 1 and 2 was found at depths ranging from 0.15 to 4.7 m (0.5 to 15.5 ft), which contradicts information regarding the amount of clean soil covering those pits.

Soil composition in areas where thorium-232 concentrations were highest in subsurface samples was compared with records of soil composition in radioactively contaminated areas of the MISS and Sears Distribution Center properties (BNI 1987a, 1987c), where the highest concentrations of thorium-232 were detected. Soils at MISS and Sears were primarily composed of sand with some silt, fine-grained, and ranging in color from dusky or grayish brown to grayish black. At Stepan, the soil was observed to be silty sand with some clay, fine-grained, and ranging in color from light gray to dark grayish black. Soils on all three properties were observed to be moist, and white material of either stiff or sandy consistency was often observed mixed with these soil types. The white material is believed to be the lithium (stiff) or thorium (sandy) residues.

Exposure rate measurements

Exterior gamma radiation exposure rate measurements were obtained to give an indication of potential exposure sustained by workers on the property (Figure 4-19). The measurements ranged from 5 to 228 $\mu\text{R}/\text{h}$, including background. Results are presented in Table C-3 (Appendix C). The average exterior exposure rate of 29 $\mu\text{R}/\text{h}$ exceeds the average background rate of 9 $\mu\text{R}/\text{h}$ and is believed to be due to high exposure rates measured in isolated areas of the property that are known to be radioactively contaminated.

Indoor exposure rate measurements were taken in Buildings 1, 4, 10, 13, 14, 20, 52, 52A, and 67 to confirm measurements from a previous survey (Morton 1982). Results ranged from 5 to 19 $\mu\text{R}/\text{h}$, including background.

Building measurements

Additional building surveys for direct and transferrable (removable) contamination were performed to confirm data collected in a previous survey (Morton 1982) and to determine whether

radioactive contamination exceeding DOE guidelines was present (see Appendix A). For alpha and beta-gamma surface contamination, the limits are those for natural thorium, thorium-232, and radium-226.

The limits for direct measurements are 1,000 dpm/100 cm² for average residual radioactivity over a square meter area and 3,000 dpm/100 cm² for maximum contamination levels; the guideline for removable alpha contamination is 200 dpm/100 cm² [DOE Order 5400.5 (DOE 1990)]. These guidelines are applied in areas where residual radioactivity remains from activities involving the handling of materials containing thorium. These areas include Buildings 4, 10, 13, 14, 15 (administration building), 20, 52, 52A, 67, 76, and 78; the pump house; and the guard shack. (Building 76 and the pump house are located on the DOE-owned MISS but are reported in this section because they were originally part of the MCW property.) Floors, walls, and beams were surveyed in most buildings. These buildings were included in the field investigation because of their use in or proximity to thorium processing operations conducted by MCW. Because the objective of these surveys was to confirm results from a previously conducted survey and not to determine absolute boundaries of contamination, only general statements are provided regarding the radiological status of the buildings.

The survey showed that alpha and beta-gamma surface radioactivity levels in many areas were above DOE guidelines for surface contamination on indoor and outdoor structures. All floor and wall measurements in Building 76 were taken systematically at 0.3-m (1-ft) intervals; measurements of the floor of Building 78 were taken at 1.8-m (6-ft) intervals. Measurements were taken at other locations by spot-checking and were reported as net cpm and dpm/100 cm². Buildings 4, 15, 20, and 78 contained areas with readings in excess of 3,000 dpm/100 cm². Buildings 4, 15, 20, 67, and 78 also had average beta-gamma readings exceeding the DOE guideline for average surface contamination for thorium-232 (1,000 dpm/100 cm²). Other buildings exhibiting localized areas of contamination exceeding 1,000 dpm/100 cm² include Buildings 10 and 13, the pump house, and the guard shack. Immediately prior to remedial action, these measurements will be confirmed, and

structural surface contamination will be better defined. Because Stepan is an operating facility, conditions of surface contamination may change significantly as a result of plant operations (e.g., general housekeeping). Such changes would invalidate any data collected too far in advance of remedial action.

The contamination in Building 15 is located primarily on the basement floor in the southeastern portion of the building; contamination on the basement walls is random. The largest area of radioactivity exceeding DOE guidelines was found on the floor in the southeastern portion of Building 78. Most spot-checks on the walls showed elevated levels of beta-gamma contamination. Other buildings with elevated levels of radioactive contamination showed random areas of contamination on most surfaces surveyed. No transferrable (removable) contamination above DOE guidelines was found at any sampling location, indicating that the contamination is fixed and will not be easily transferred to other areas or surfaces.

Table 4-8 presents data collected and includes the type of emission measured, the range of readings within each building or location, the average of all readings taken in a building or at a location, and the number of readings taken at each location. Although individual readings in some buildings were in excess of guidelines, it cannot be concluded that in such cases entire buildings are contaminated. The information presented in Table 4-8 suggests that more detailed surveys should be performed before the buildings on the Stepan property are cleaned up.

Based on evaluation of near-surface gamma radiation measurements, surface and subsurface soil sample analyses, and downhole gamma logging, surface and subsurface radioactive contamination is believed to be present on the Stepan property at depths ranging from 15 cm (6 in.) to 4.7 m (15.5 ft). The areas of contamination are shown in Figures 4-16 and 4-18.

Subsurface contamination is known to extend beneath Building 3 (location of burial pit 3) and appears to extend beneath Buildings 15, 78, 20, and the guard shack. Historical documentation (aerial photographs, interviews with Stepan

personnel, and previous radiological surveys) indicates that the subsurface contamination exists primarily in areas where thorium processing operations occurred, where process residues were buried, or near the locations of former retention ponds. These findings are summarized in more detail in Section 4.4.2.

4.4.2 Evaluation of Chemical Contaminants

Ten boreholes on the Stepan property were also sampled for chemical analysis. These boreholes, with a prefix of B3890, were selected from five areas that exhibited subsurface radioactive contamination (C207, C218, C255, C297, and C298); three areas with surface radioactive contamination only (C296, C299, and C701); and two areas that were not radioactively contaminated (C208 and C217). Sampling locations are shown in Figure 4-20; the corresponding surface and subsurface radiological data are shown in Figures 4-16 and 4-18.

Metals

The identification of metals in soil at the Stepan property is based on the analysis of 39 biased soil samples collected from the 10 boreholes at depths ranging from near surface [0 to 0.6 m (0 to 2 ft)] to a maximum of 5 m (16.5 ft). Twenty-three metals were identified at levels above representative background concentrations (Table 4-3); the data are summarized in Table 4-9. Of the metals identified, seven (arsenic, cobalt, lead, nickel, selenium, and vanadium) meet the criteria for classification as FUSRAP waste because of their presence in monazite sands, or because they are uranium analogue metals (see Section 4.2). The sampling locations where these metals were detected are shown in Figure 4-20.

A comparison of data for these metal constituents with surface and subsurface radiological data (Figures 4-16 and 4-18) indicates that they occur most frequently in radioactively contaminated areas. The frequency of occurrence is defined as the ratio of the number of above-background occurrences of the constituent within

areas of radioactive contamination to the total number of above-background occurrences of the constituent. The frequency of occurrence of these metals at the Stepan property ranges from 42 to 74 percent (see Table 4-9).

Lithium, antimony, barium, boron, cadmium, and thallium (none of which are constituents of monazite sands) were also detected with varying frequency in areas of radioactive contamination and would, therefore, in these areas, also be considered constituents of FUSRAP waste. The frequency of detection of these metals decreases with increasing sampling depth.

Although metal contaminants classified as FUSRAP waste because of their association with thorium processing activities were detected most frequently in areas of radioactive contamination, they were also found in areas that are not radioactively contaminated. These metals could be the result of processes other than thorium extraction at MCW or other chemical processes performed at the Stepan Company; the metals could also be the result of long-term industrialization or urban fill being placed in the area.

Rare earths

Thirty-nine biased soil samples collected from the same 10 boreholes that were evaluated for metals (Figure 4-20) were also analyzed for rare earth elements. Analytical results are summarized in Table 4-10. Seven rare earth elements were detected at above-background concentrations; three (cerium, lanthanum, and dysprosium) met the criteria for classification as FUSRAP waste constituents because they are the principal rare earth constituents of monazite sands. Maximum concentrations of these elements were as follows: cerium (6,620 mg/kg); lanthanum (3,770 mg/kg); and dysprosium (94.5 mg/kg). Gadolinium, lutetium, neodymium, and samarium, although not principal rare earth constituents of monazite sands, would be classified as FUSRAP waste when they coexist in areas of radioactive contamination. The rare earth elements most frequently detected at the Stepan property during the RI were cerium, lanthanum, and neodymium (Table 4-10).

Greater than 90 percent of the occurrences of cerium, lanthanum, and dysprosium at concentrations above representative background were in the biased samples taken primarily from areas of radioactive contamination. In four of the ten boreholes drilled on the Stepan property, no rare earth elements were found at concentrations above method detection limits. Two of these boreholes (C208 and C217) were not in areas of radioactive contamination, and three (C296, C299, and C701) were in areas where radioactive contamination was limited to the surface. Samples from boreholes that had subsurface radioactive contamination (C207, C218, C255, C297, and C298) contained concentrations of rare earth elements that were above representative background. Figures 4-21 through 4-25 illustrate the coexistence of rare earth elements and radioactive contamination in the three burial pit areas on the Stepan property; the burial pits are described in Section 4.3. These figures show the approximate horizontal and vertical extent of radioactive contamination and the results of rare earth analyses for samples from the associated chemical boreholes.

The results of the investigation at the Stepan property suggest that areas that are not radioactively contaminated do not contain detectable or significant concentrations of rare earth elements, whereas concentrations of rare earths in samples from radioactively contaminated boreholes were above representative measured background. This indicates that elevated concentrations of certain rare earth elements correspond to areas of radioactive contamination and areas known to contain thorium processing residues.

VOCs

Twelve soil samples from four boreholes were analyzed for VOCs. One sample each was collected from boreholes C207 and C296, and five samples each were collected from boreholes C299 and C701. Table 4-11 summarizes data for VOCs detected at the Stepan Company property; complete results are provided in Appendix C. Ten VOCs were detected, seven at levels above the baseline concentrations measured in samples taken from locations representative of soils in the area, yet uninfluenced by activities at MCW or Stepan. Toluene was detected above the baseline comparison concentration with the greatest frequency (33 percent), but all VOC concentrations were in the low ppb range. In general, trace levels of VOCs detected at the Stepan property were found in both radioactively contaminated and uncontaminated areas. Review of historical data has established that organic compounds were not used in the thorium processing operations; therefore, the VOCs identified on the Stepan property are not associated with these operations and are not considered constituents of FUSRAP waste unless they are commingled with radioactive material. The presence of these compounds may have resulted from operations at the current facility or from previous site operations not associated with monazite sands or thorium processing.

BNAEs

Eleven soil samples from five boreholes (C207, C296, C298, C299, and C701; see Figure 4-20) were analyzed for BNAEs. Table 4-12 presents a summary of BNAE data; complete results are provided in Appendix C.

In general, BNAEs were detected at trace concentrations in both radioactively contaminated and uncontaminated areas. Trace levels of certain BNAE compounds are typically found in industrial settings such as Maywood, especially when these areas contain asphalt surfaces. Most of the BNAEs detected are polycyclic aromatic hydrocarbons (PAHs), which are commonly occurring products of natural organic decay (e.g., of vegetation) or degradation of coal-derivative products (e.g., asphalt). PAHs are typically not mobile and would not be expected to migrate from the Stepan

property, given the low concentrations and low frequency of detection.

Organics were not used in the thorium processing operations at MCW; therefore, BNAEs do not meet any of the criteria for classification as FUSRAP waste at the Stepan property except where commingled with radioactive contamination.

TPH

Thirty-one soil samples collected from near surface to a maximum depth of approximately 6 m (20 ft) in eight boreholes on the Stepan property were analyzed for TPH. The boreholes sampled (Figure 4-20), number of samples analyzed, sampling depths, and concentration ranges are presented in Table 4-13. The maximum TPH concentration (9,800 mg/kg) was found at a depth of 0 to 0.6 m (0 to 2 ft) in borehole C296, which was not radioactively contaminated. Generally, TPH concentrations decreased with depth.

The only other sample in which TPH exceeded the 1,000-mg/kg NJDEPE limit for priority pollutant analysis was the sample taken at 0 to 0.6 m (0 to 2 ft) from radioactively contaminated borehole C207 (1,600 mg/kg).

TCLP analyses

Results of analyses for TCLP metals (36 samples), VOCs (36 samples), pesticides (27 samples), and herbicides (28 samples) did not exceed EPA regulatory levels established by the toxicity characteristic criteria. The regulatory guidelines for TCLP analysis are presented in Table 4-14; the data are presented in Appendix C. Tests for corrosivity and reactivity indicated that soil samples collected at the Stepan property were neither corrosive nor reactive according to 40 CFR 261. PCB analysis indicated that PCBs were not present at concentrations above method detection limits.

Thirty-six soil samples from nine boreholes were analyzed for TCLP BNAEs. Hexachlorobenzene was detected at 500 $\mu\text{g/L}$ in one sample from a radioactively contaminated borehole (C218) at a depth

of 1.8 to 2.4 m (6 to 8 ft); this concentration exceeds the calculated EPA regulatory level of 130 $\mu\text{g/L}$ (40 CFR 261.24). Additionally, in nine other soil samples, hexachlorobenzene and 2,4-dinitrotoluene were identified as nondetectable at a method detection limit at or above EPA regulatory levels. However, a constraint of detection limits for hexachlorobenzene and 2,4-dinitrotoluene is acknowledged in 40 CFR 261.24. This constraint, which is based on the fact that the regulatory levels of these compounds are below concentrations measurable using currently available methods, allows raising the regulatory level (five times the analytical detection limit) to establish the quantitation limit as a new regulatory level. Neither hexachlorobenzene nor 2,4-dinitrotoluene exceeds the regulatory levels thus established.

Mobile ions

The chemical forms of thorium most likely to be present on the Stepan property can be derived from historical processing information, NRC licenses held by the company, and NRC inspection reports. Burial pits 1 and 2 contain primarily thorium waste material in the form of thorium phosphate (NRC 1981a). The chemical forms of the thorium waste in burial pit 3 include both thorium phosphate and thorium hydroxide (Stepan 1981). [These wastes were originally located in various areas around the site prior to placement in the burial pits (see Section 4.3)]. Thorium nitrate and thorium oxide were products of processing operations at the facility. Manufacturing also resulted in the production of intermediates and byproducts. Records indicate that other compounds produced at the facility included thorium sulfate, thorium carbonate, thorium dioxide, and thorium chloride (AEC 1963). Because thorium may exist onsite in the aforementioned chemical forms, soil samples were analyzed for mobile ions including chloride, nitrate, and phosphate. Soil samples were not analyzed for sulfate ions. Concentrations of mobile ions detected at the Stepan property are reported in Table C-16 (Appendix C).

In summary, 23 metals were identified at above-background

concentrations at the Stepan property. The seven constituents of monazite sand and associated uranium analogue elements (arsenic, cobalt, copper, lead, nickel, selenium, and vanadium) were found with greatest frequency in the presence of radioactive contamination but were also detected in some areas that were not radioactively contaminated. Seven rare earth elements were detected at concentrations above measured background; cerium, lanthanum, and dysprosium were classified as FUSRAP waste constituents because they are the principal rare earth constituents of monazite sands. The rare earth elements most frequently detected were cerium, lanthanum, and neodymium. All the rare earth elements were found most frequently in areas and at depths that are radioactively contaminated. Several VOCs and BNAEs were detected, but both the concentrations and the frequency of detection of organics were quite low. Organics at the Stepan property do not meet the criteria for classification as FUSRAP waste except where commingled with radioactive contamination. TCLP analysis for metals, VOCs, BNAEs, pesticides, and herbicides and an evaluation of corrosivity/reactivity did not identify any constituent as a characteristic RCRA-hazardous waste. No PCBs were detected.

Complete analytical results for all soil samples collected at the Stepan property are presented in Appendix C.

4.4.3 Summary of Sampling Activities at Stepan Operable Unit

Primary and secondary sources of subsurface radioactive contamination at the Stepan property are shown on maps that were constructed by using downhole gamma log profiles of the boreholes drilled on the property (Figure 4-20). These maps define areas of contamination by depth in 0.3-m (1-ft) intervals for the first 1.5 m (5 ft), and in 1.5-m (5-ft) intervals from 1.5 to 4.5 m (5 to 15 ft). The maps also indicate intervals where metals, BNAEs, and TPH compounds were detected at concentrations above NJDEPE guidelines. These maps define three areas (burial pits) of primary radioactive and associated chemical contamination and eight smaller areas of secondary soil contamination (lower concentrations of radioactive contamination) on the Stepan property (see

Section 4.3).

Primary areas of contamination

Burial pit 1. Burial pit 1 [approximately 30.5 by 15.25 m (100 by 50 ft)] is located in the northern portion of the property in the Stepan parking lot. The maximum depth of radioactive contamination in this pit is 4.1 m (13.5 ft) in borehole R134. Near-surface [0- to 1.6-m (0- to 2-ft)] downhole gamma log measurements are slightly above 30,000 cpm. These count rates increase with depth to a maximum of 676,000 cpm at a depth of 3 m (10 ft) at the bottom of borehole R126. The other boreholes in the pit also reach comparable maximum levels in the 1.5- to 4.5-m (5- to 15-ft) interval. Metal contaminants were found in soil samples from both boreholes drilled for chemical analysis in the area. Lead and lithium were found at maximum concentrations of 328 and 383 mg/kg, respectively, from the surface to 1.8 m (6 ft) in borehole C297. TPH compounds were also detected from 0 to 1.2 m (0 to 4 ft) at a maximum concentration of 620 mg/kg in the 0- to 0.6-m (0- to 2-ft) interval in borehole C298.

Burial pit 2. Burial pit 2 [approximately (200 by 100 ft) 60 by 30.5 m] is located along the east-central portion of the Stepan property adjacent to the office building on West Hunter Avenue. The maximum depth of radioactive contamination is below 94.7 m (15.5 ft). Downhole gamma log count rates of 731,000 cpm were recorded at the bottom of borehole R143 in the east-central portion of the pit. Downhole gamma log count rates are slightly elevated at the surface but increase rapidly with depth and reach a rate greater than 250,000 cpm in the 0.6- to 1.2-m (2- to 3-ft) interval. These gamma log count rates remain high and reach a maximum of over 1,000,000 cpm in the 2.1- to 7.3-m (7- to 24-ft) interval. Two boreholes were drilled for chemical sampling and analysis in the area of burial pit 2. Metals detected at concentrations above background (lithium, lead, and chromium) were detected in both of these boreholes. The interval of the maximum metal contamination [1.8- to 2.4-m (6- to 8-ft)] corresponds to the interval of the maximum downhole gamma log count rates. No

concentrations in excess of NJDEPE guidelines for BNAEs or TPH were detected in soil samples from burial pit 2.

Burial pit 3. Burial pit 3 underlies a large warehouse in the southeast portion of the property. The areal extent of this burial pit cannot be accurately determined while this building is in place; however, a detailed description of the pit is provided in Section 4.3. A number of samples from boreholes and hand auger samples that were taken immediately adjacent to the building indicate significant concentrations of radioactive and chemical contamination in the area. Downhole gamma log count rates measured in boreholes near the northeastern corner of the building show elevated concentrations to depths of 4.3 m (14.0 ft). Maximum count rates recorded were in excess of 300,000 cpm in the 1.5- to 4.3-m (5- to 14-ft) interval. Two boreholes were drilled for chemical sampling and analysis near the northeastern corner of the building. Elevated concentrations of metals (including lithium, lead, chromium, and arsenic) were detected over the entire 0- to 4.3-m (0- to 14-ft) interval. TPH compounds were detected at depths in excess of 3.1 m (10 ft). BNAE compounds were detected sporadically in the 0- to 0.6-m (0- to 2-ft) interval.

Secondary areas of contamination

A number of areas of slightly elevated radioactive contamination are located in the northwestern corner of the property and along the southern property line, adjacent to the Sears Distribution Center property. The three most significant areas are in the south-central portion of the Stepan property.

An area approximately 30.5 by 10 m (100 by 30 ft), located north of the railroad spur, in the southwestern corner of the Stepan property is defined on the maps. This area of elevated downhole gamma log measurements (>350,000 cpm) extends to a depth of approximately 1.2 m (4 ft). Lagoons that can be seen in this area in 1940 aerial photographs (see Section 4.3.1) are probably the source of radioactive contamination currently found in subsurface soils. No samples were taken for chemical analysis in this area.

Elevated concentrations of radioactive contaminants are localized in the northern portion of a former retention pond along the south-central property boundary and extend southward onto the Sears Distribution Center property. Maximum downhole gamma log measurements in this area are in excess of 350,000 cpm in the 1.5- to 3-m (5- to 10-ft) interval. The contamination extends to a depth of 2.7 m (9 ft) in borehole R284, located in the northwestern corner of the former retention pond. No samples were taken for chemical analysis in this area.

A small area of elevated downhole gamma log measurements, located north of the former retention pond, is defined on the maps.

Downhole gamma log measurements in excess of 700,000 cpm were recorded in borehole R714 in this area. Laboratory data (soil radionuclide concentrations) from this borehole do not confirm these measurements, and a validation check is being performed. BNAE contamination was also found at depths to 1.2 m (4 ft) in borehole C299 in this area.

4.5 SOIL, MISS OPERABLE UNIT

Data objectives for this operable unit, as described in the field sampling plan were:

Objective 1: Determine whether waste in the storage pile contains RCRA-hazardous waste and determine average concentrations of radioactive waste in the pile

Objective 2: Determine presence/identity of chemical contaminants in onsite soil

Objective 3: Determine whether chemical contaminants are migrating from MISS via surface water, sediment, or groundwater

Objective 4: If chemical contaminants are present that require corrective action, assess the extent of the contamination

4.5.1 Evaluation of Radioactive Contaminants

Radiological investigation of MISS was performed by BNI in 1986 (BNI 1987a). These results indicated that the areal extent of contamination includes virtually the entire MISS property (Figure 1-10). Depths of contamination indicated by downhole gamma logging during the 1986 characterization were consistent with results of downhole gamma logging performed during the RI.

Reconstruction of the thorium extraction process used at MCW shows that thorium was present as an oxide, a sulfate, an oxalate, a hydroxide, and a nitrate. According to NRC records, thorium was also present as a phosphate and a chloride (NRC 1981a-d; Stepan 1981). The oxide, oxalate, hydroxide, and phosphate are insoluble; the sulfate is only slightly soluble. The nitrate and chloride are highly soluble; however, the thorium ion has a high distribution coefficient and therefore would be bound to the soil matrix, which would greatly impede its mobility (Sheppard et al. 1984). Consequently, thorium nitrate, thorium chloride, and thorium sulfate would not be expected to move by solution and transport in groundwater; any migration would occur through physical movement of the process or waste materials. Because thorium-232 (the primary contaminant at the Maywood Site) is present largely in the form of salts that are highly insoluble in water, and because the known areas of radioactive contamination at MISS are covered by vegetation or gravel, significant contaminant migration is not expected to occur over time. However, thorium is somewhat soluble in certain compounds that are present at the Maywood site.

Except for additional sampling, no changes or disturbances resulting from human activity have occurred at the property. Because of the long half-lives of the radionuclides of interest at the site, radioactive decay since 1986 has been negligible. For these reasons, data from the 1986 characterization activities were used to determine locations for chemical sampling of onsite soils during the RI, and the interim storage pile was sampled during the RI for analysis of chemical parameters specified by NJDEP. The results are presented in Section 4.5.2; downhole gamma logs are

presented in Appendix D. During the fall of 1989, a geologic investigation of MISS was performed as part of the RI efforts. Information from that activity is presented in Section 3.4.

4.5.2 Evaluation of Chemical Contaminants

MISS interim storage pile

Chemical analytical data for the interim storage pile and for other onsite locations at MISS are discussed separately. Chemical contaminants found on MISS are included in the FFA definition of FUSRAP waste and will be addressed in the baseline risk assessment and feasibility study. Results of chemical characterization of the interim storage pile were presented in a characterization report (BNI 1991b). The analytical data presented in that document allowed NJDEPE to characterize the soil in the storage pile as nonhazardous waste (Kaup 1991).

The interim storage pile at MISS occupies approximately 0.8 ha (2.0 acres), has an average height of 5.5 m (18 ft), and contains approximately 27,000 m³ (35,000 yd³) of waste material. A 15-cm (6-in.) layer of sand placed on top of an impermeable Hypalon® liner beneath the pile collects leachate that forms in the pile; the liner slopes toward two sumps that are part of a collection system designed to ensure movement and collection of leachate. The pile is also covered by a Hypalon® surface cover, which is sealed to the bottom liner. This design inhibits any release of chemical contaminants that might otherwise be leached into the subsurface environment or released from the pile surface by water or wind erosion. Therefore, the storage pile is not considered a source of chemical contaminants.

Figure 4-26 identifies sampling locations, and Table 4-15 provides information on sampling depths for 37 boreholes drilled at the storage pile. The borehole identification prefix for all storage pile boreholes is B3890.

TPH. TPH analysis was performed on 150 soil samples from the 37 boreholes drilled at the storage pile; results are presented in

Appendix D. These analyses were performed to identify the need for further chemical testing, not to characterize the pile. Twenty-eight (17 percent) of the samples exhibited TPH concentrations above 1,000 mg/kg and therefore were further analyzed for priority pollutants (VOCs, BNAEs, and PCBs/pesticides). (The 1,000 mg/kg threshold is equivalent to the 1,000 ppm threshold established by NJDEPE for further analysis of samples for priority pollutants.)

VOCs. Twenty-eight soil samples from 18 borehole locations at the storage pile were analyzed for VOCs. These 18 locations were selected on the basis of TPH analysis results; for samples in which TPH concentrations did not exceed 1,000 mg/kg, VOC analysis was not required, in accordance with guidance from NJDEPE. Fifteen VOCs were detected; three were found at levels above the mean measured concentrations in samples taken to establish baseline concentrations in the Maywood area. Toluene was detected with the greatest frequency (54 percent). Table 4-16 summarizes VOC data for the storage pile; complete results are presented in Appendix D.

It should be noted that most of the material in the storage pile was transported from an area of the Ballod property where waste material was stored in retention ponds. Thorium processing operations at MCW did not use organic compounds and therefore can be eliminated as the potential source of VOCs found in the storage pile. The detection of VOCs, particularly toluene, indicates that the source of these compounds was a process other than the thorium processing at MCW. Regardless of their source, however, DOE is responsible for these contaminants because of their presence at MISS and their coexistence with radioactive materials.

BNAEs. Twenty-nine samples from the 18 boreholes in which TPH exceeded 1,000 mg/kg were analyzed for BNAEs. Thirty-one BNAEs were detected; nine were found at concentrations above mean reference baseline concentrations. Table 4-17 summarizes the BNAEs detected in the storage pile and presents a comparison with concentrations at the reference baseline sampling locations.

No pattern of BNAE distribution in soil was discernible across the pile. All of the compounds detected were PAHs, which are typically found in industrial settings and are associated with coal

products or coal-derivative materials such as asphalt or with natural organic decay of vegetation. In addition, material in the pile was transported from the retention ponds that were located on the Ballod property. Because these ponds held wastes generated at MCW, BNAEs could have been introduced into the pile by the blending of materials containing thorium waste with other process wastes. DOE is responsible for these contaminants because they are on MISS and commingled with radioactive materials.

TCLP analyses. Analytical results for TCLP metals, VOCs, BNAEs, pesticides, and herbicides did not exceed regulatory limits that would define material in the pile as RCRA-hazardous waste. The regulatory guidelines for toxicity characteristic analysis are shown in Table 4-14. Based on this determination, the VOCs and BNAE compounds identified at above-background concentrations are not leachable and therefore will not migrate from the site or impact the groundwater system. Results of reactivity and corrosivity tests were also below regulatory limits that would define the soil as RCRA-hazardous waste. Pesticide and PCB concentrations were below detection limits. Complete analytical results for soil samples collected at the pile are presented in Appendix D.

MISS onsite

Figure 4-27 identifies borehole locations for the MISS onsite chemical sampling program. Tables 4-18 and 4-19 provide information on sampling depths and analyses for each of these boreholes. Complete chemical analytical results and geologic logs for soil samples collected from MISS onsite locations are presented in Appendix D.

Metals. Seventy soil samples from 34 MISS onsite boreholes were analyzed for metals. Twenty-three metals were detected; 22 were found at concentrations above background. Table 4-20 presents a summary of the metals data for MISS and compares the results with background concentrations. Metals data are presented in Appendix D.

DOE is responsible for all chemical contamination on MISS; however, of the 22 metals detected at concentrations above representative mean background, only eight metals known to be constituents of thorium ores (and uranium analogue metals) processed at MCW or lithium wastes disposed of onsite are discussed in detail in this report. The other metals detected at concentrations above representative mean background (listed in Table 4-20) will be addressed in the baseline risk assessment. The metals identified as components of thorium ores, uranium analogue metals, and lithium wastes are arsenic, cobalt, copper, lead, lithium, nickel, selenium, and vanadium. Figures 4-28 through 4-34 illustrate areas of maximum occurrence of these metals in soil. These metals occur within a parcel that extends from an area east of Building 76 (represented by boreholes C001, C003, and C022) to an area west of the storage pile (roughly represented by boreholes C025 and C029). Several boreholes that are peripheral to the storage pile (C031, C010, C006, and C029) and in the area east of Building 76 (boreholes C001, C003, and C022) exhibited some of the highest concentrations of metals. Arsenic, chromium, copper, lead, lithium, and nickel were detected at least once at levels an order of magnitude above representative measured background (Table 4-20). These metals also occurred at concentrations above measured background in a second, smaller area, represented by boreholes C026, C027, and C028, south of the storage pile (see Figure 4-27).

To determine whether chemical constituents were commingled with radioactive contamination, the majority of the soil samples collected for chemical analysis were collected from known areas of radioactive contamination, based on a gamma log survey. These sampling locations were in the immediate vicinity of Building 76 (C001, C002, C003, C004, and C022). Radioactive intervals sampled at other locations included the 1.8- to 2.4-m (6- to 8-ft) depth interval of C021, the 1.2- to 1.8-m (4- to 6-ft) depth interval of C030, and the 0- to 0.6-m (0- to 2-ft) depth interval of C008. Based on a correlation of data from metals analysis with the occurrence of radioactive contamination (as defined by subsurface gamma logging), only lead and selenium were detected frequently in areas of radioactive contamination.

In summary, the processing of monazite sands and the disposal of lithium process waste at MCW may have contributed to the presence of certain metals at MISS. Arsenic, cobalt, copper, lead, lithium, selenium, and vanadium, which are known to be constituents of thorium or lithium wastes, were detected with significant frequency in MISS onsite soil at above-background concentrations. In general, their occurrence extends from an area east of Building 76 to an area west of the storage pile. Only limited correlation was observed between the detection of specific metals and specific areas and depth intervals of radioactive contamination.

Rare earths. Seventy soil samples from 34 boreholes were analyzed for rare earth elements; analytical results are summarized in Table 4-21. Eleven rare earth elements were identified at levels above method detection limits; three (cerium, lanthanum, and neodymium) were identified at greater concentrations and frequencies. Maximum concentrations of these elements were as follows: cerium (3,140 mg/kg), lanthanum (1,560 mg/kg), and neodymium (1,310 mg/kg). Two other rare earth elements (tellurium and samarium) were also detected at concentrations above mean representative background in radioactively contaminated areas (Table 4-21). Dysprosium, although identified as a constituent of monazite sand, was not detected at concentrations above the detection limit. More than 60 percent of the above-background

occurrences of cerium, lanthanum, and neodymium were in areas of radioactive contamination (near Building 76, around the perimeter of the interim waste storage pile, and in isolated locations bordering Route 17). The borehole locations are shown in Figure 4-27.

There appears to be a correlation (>60 percent frequency; see Table 4-21) between the occurrence of rare earth elements and the locations and intervals that are radioactively contaminated. Figures 4-35 through 4-37 illustrate the coexistence of rare earth elements and radioactive contamination. Rare earth elements generally were detected only at depth intervals that were radioactively contaminated; exceptions were noted at boreholes C024, C029, C016, and C031 and in the deepest sampling intervals of C001 and C022.

In summary, the high frequency with which elevated concentrations of rare earth elements were observed to coexist with radioactive contamination at MISS suggests a link with thorium processing operations at MCW. DOE is responsible for all rare earth elements detected at concentrations above background at MISS.

VOCs. Seventy-three soil samples from 33 boreholes were analyzed for VOCs; analytical results are summarized in Table 4-22, and complete VOC data are presented in Appendix D. Sampling depths ranged from near surface [0 to 0.6 m (0 to 2 ft)] to a maximum of 6.6 m (21.5 ft) (borehole C004). Eleven VOCs were detected; four compounds were found at concentrations above mean reference baseline. Toluene was detected with the greatest frequency (14 percent).

The results of VOC analysis indicate that trace concentrations of VOCs occur throughout the Maywood Site; however, there is no evidence that organic compounds were used during thorium processing operations at MCW. Historical information indicates that the former retention ponds for process waste effluents from several nonradiological processes were located on MISS.

To evaluate the coexistence of VOCs with areas and intervals of radioactive contamination, the chemical data from onsite boreholes were compared with gamma log results from the same boreholes. In general, trace levels of VOCs onsite were detected in both

radioactively contaminated and nonradioactively contaminated areas.

The low frequency of detection and the low concentrations of VOCs found at MISS indicate that these compounds are not significant contaminants. The presence of VOCs is likely to have resulted from previous MCW operations other than thorium processing. However, VOCs do meet the criteria for inclusion as FUSRAP waste because they exist on DOE-owned property (MISS).

BNAEs. Sixty-eight soil samples collected from 33 boreholes were analyzed for BNAEs. Twenty-nine BNAE compounds were detected (18 at concentrations above reference baseline); the data are summarized in Table 4-23. BNAEs were identified in 14 boreholes in the following areas: Building 76 (boreholes C001, C002, C004, C022, and C023); the MISS/Stepan property boundary (boreholes C032, C010, C020, C027, and C028); and peripheral to the storage pile (boreholes C030, C024, C006, and C034).

The BNAE compounds identified and the concentrations at which they were detected are typical of heavily industrialized areas. Like VOCs, BNAEs occur at trace levels in both radioactively contaminated and noncontaminated areas. These findings suggest that the compounds present on MISS are directly associated with areas and intervals of radioactive contamination. Despite the low frequency of detection, low concentrations, and historical knowledge that no organics were used in the thorium processing operations, BNAE compounds present on MISS are considered FUSRAP waste as defined by the FFA.

TPH. Forty-five soil samples collected from 32 MISS onsite boreholes were analyzed for TPH. The only sample in which TPH exceeded 1,000 mg/kg was sample 138-MS-C-013 from the 0- to 3-m (0- to 10-ft) interval in borehole C003 (Figure 4-27); the TPH concentration was 1,100 mg/kg. Petroleum hydrocarbon compounds are not considered to be major contaminants at MISS.

TCLP analyses. Results of TCLP analysis for metals, VOCs, BNAEs, pesticides, and herbicides were below detection limits or EPA regulatory levels established in the TCLP guidance (40 CFR 261). The TCLP BNAE analytes 2,4-dinitrotoluene and hexachlorobenzene were noted as nondetectable at a value equal to the EPA regulatory limit in one sample (138-MS-C-011) from

borehole C011 at a depth of 1.8 to 2.4 m (6 to 8 ft). However, regulatory levels for these analytes were adjusted based on quantitation limits, thereby defining new regulatory levels, which the results do not exceed (40 CFR 261.24). Tests for reactivity (cyanide and sulfide) indicated that the soil samples were not reactive according to guidelines provided in 40 CFR 261. No PCBs were detected.

Mobile ions. Thorium nitrate and thorium oxide were products of processing operations at MCW. Manufacturing also resulted in the production of intermediates and byproducts. Records indicate that thorium sulfate, thorium carbonate, thorium nitrate, thorium dioxide, and thorium chloride were produced at the facility (AEC 1963). Because thorium is expected to be present at the site in all of these forms, soil samples were analyzed for mobile ions including chloride, nitrate, and phosphate. Sulfate analysis was not performed. Mobile ion data for MISS onsite locations are presented in Table D-24 (Appendix D).

4.5.3 Summary of Sampling Activities at MISS Operable Unit

The following discussion is based on all available data from MISS. Data sources include information gathered during the initial property characterization work performed in 1986 (BNI 1987a) and additional data gathered during subsequent investigations. Subsequent work included drilling, downhole gamma logging, and sampling of boreholes for radiological analysis; monitoring well installation and sampling; and drilling boreholes for chemical sampling and analysis. Downhole gamma logging was performed in all subsurface penetrations, and the logs were used to construct maps of subsurface gamma activity at 0.3-m (1-ft) intervals from 0 to 1.5 m (0 to 5 ft) and at 1.5-m (5-ft) intervals to a depth of 4.6 m (15 ft). These maps are presented as Figures 4-2 through 4-8.

Primary sources of contamination

Five primary sources of contamination exist at MISS; four of these sources correspond to former retention ponds that were

located along the northern and western perimeters of the property. These retention ponds were in use from 1940 through the mid-1960s. The fifth primary source of contamination is the former location of the thorium processing building in the northeastern corner of the property. Surface and subsurface soil contamination from this area extends to the east and south onto the adjoining Stepan Company property. Four areas of relatively minor soil contamination were also defined in the east-central portion of the MISS property (Figure 4-9).

Retention ponds

Retention ponds discussed in this section are referred to by letter designation (A, B, C, and E) as shown in Figure 4-10.

Retention pond A was located along the north-central property line of MISS. Because the area covered by this former retention pond is not accurately defined by subsurface investigations, the boundaries are inferred based on analysis of aerial photographs. The pond was approximately 100 by 45.7 m (325 by 150 ft). The northern limit of this area has been defined by 16 boreholes, but the southern boundary of the pond is not well defined because it extends beneath the interim storage pile. No drilling has been performed along the southern boundary. The maximum depth of radioactive contamination encountered during drilling was 2.4 to 2.7 m (8 to 9 ft) along the eastern and northern perimeters of the pond. Radioactive contamination in the soil, indicated by downhole gamma logs, approaches but does not exceed 30,000 cpm from 0 to 0.6 m (0 to 2 ft). Downhole gamma log count rates increased with depth and reached a maximum in the interval from 1.5 to 3 m (5 to 10 ft). The maximum downhole gamma log count rate measurement was 353,000 cpm in borehole C021, at a depth of 1.5 m (5 ft).

Chemical contaminants (metals, BNAEs, TPH) were detected in samples from boreholes C005 and C021. Chemical contamination occurs in the same areas and depths as radioactive contamination. Maximum concentrations were measured in samples from the 1.5- to 3-m (5- to 10-ft) depth interval. Metals (lithium, lead, and arsenic), BNAEs, and TPH were detected in the 0- to 2.4-m (0- to

8-ft) interval in borehole C021. The extent of contamination in retention pond A probably corresponds to the entire area delineated in the aerial photographs. Maximum concentrations of radioactive and chemical contaminants under the storage pile are unknown but are probably higher than the levels found along the periphery of the former retention pond.

Retention pond B was located in the northwest corner of the MISS property. This former retention pond was comprised of two areas separated by a central dike, as shown in the historic photographs. Limited subsurface information is available for this area. A pad for a second interim storage pile has been constructed and limits access in this area. Five boreholes have been drilled along the northwest and west perimeter, five in an isolated area on the southern edge, and three along the eastern margin of this former retention pond. The areal extent of the former pond is approximately 68 by 76 m (225 by 250 ft). Radioactive contamination extends to a maximum depth of 3.2 m (10.5 ft) in the northwestern portion of the pond, with the maximum downhole gamma log count rate of 366,000 cpm recorded at a depth of 2.3 m (7.5 ft) in borehole MISS-71C.

Chemical contamination (metals, BNAEs, TPH) was reported in samples from this portion of the pond, represented by the 0- to 0.6-m (0- to 2-ft) interval in borehole C008-1. Detectable TPH concentrations and elevated concentrations of lithium were also reported to depths of 2.3 m (7.5 ft) and 3.2 m (10.5 ft), respectively, in this borehole. Gamma log measurements in boreholes C012 and C012-1, were slightly above 30,000 cpm in the near-surface and increased with depth. Downhole gamma log count rate measurements reach a maximum of 425,000 cpm in the 1.5- to 4.3-m (5- to 14-ft) interval. BNAEs associated with radioactive contamination were reported in samples collected below 3 m (10 ft) in borehole C012. Elevated radionuclide concentrations were encountered in two boreholes along the eastern boundary of pond B in the 1.5- to 3-m (5- to 10-ft) interval. The maximum recorded downhole gamma log count rate was 71,000 cpm. Lithium (borehole C025) and BNAEs were also detected along the eastern perimeter of the pond area at depths greater than 3 m (10 ft). The

contamination probably extends over the entire area to a depth of at least 4.6 m (15 ft). Metals (cadmium, arsenic, and lithium) and BNAEs are probably associated with the radioactively contaminated soil in the eastern section. Petroleum hydrocarbon compounds may also be present in the shallow portion of this section of the pond to a maximum depth of 3 m (10 ft).

Retention pond C was located south of the railroad spur, along the west-central property boundary. This pond was approximately 76 by 76 m (250 by 250 ft). Elevated concentrations of radionuclides were detected in this area from the surface to a depth of 0.6 m (2 ft), extending eastward approximately 30 m (100 ft) from the western property line adjacent to Route 17 onto the MISS property. Downhole gamma log count rate measurements of 220,000 cpm were recorded in the uppermost section of borehole MISS-81. Below 0.6 m (2 ft), to a depth of 1.5 m (5 ft), contamination is localized in two separate lenses, along the northern and southern boundaries of the pond. These two lenses are separated by an area of clean soils. Radioactive contamination increases with depth in both lenses. In the 1.5- to 3-m (5- to 10-ft) interval, contamination covers essentially the entire area of the former retention pond and then tapers off into two separate areas in the 3- to 4.5-m (10- to 15-ft) interval. Maximum downhole gamma log count rate measurements (greater than 500,000 cpm) occurred in the 1.2- to 2.1-m (4- to 7-ft) interval in two boreholes.

Chemical contamination (metals, BNAEs, TPH) is also present in this area. Metals, including cadmium, copper, lithium, arsenic and chromium, were present in samples from the near-surface interval [0 to 0.6 m (0 to 2 ft)]. Elevated concentrations of lithium were also reported in the 3- to 4.5-m (10- to 15-ft) interval in borehole C026. Elevated concentrations of semivolatiles were reported in association with the elevated concentrations of metals in this borehole. Elevated TPH concentrations were reported in 0- to 3.6-m (0- to 12-ft) interval in borehole C016 on the southern boundary of the pond. The maximum depth of contamination in this area is 3.9 m (13 ft) in borehole C016.

Former retention pond E is located in the extreme southwestern corner of MISS adjacent to Route 17. This area of contamination is approximately 91 by 37 m (300 by 120 ft). Radioactive contamination covers the entire surface area of the former retention pond. Downhole gamma log count rate measurements were very high in the first 0.6 m (2 ft) of soil; measurements were greater than 500,000 cpm over a significant portion of the area, increasing to a maximum reading greater than 1,000,000 cpm at a depth of 0.3 to 0.6 m (1 to 2 ft) in borehole MISS-43R. Downhole gamma log count rates in boreholes in this area decreased rapidly with depth below 0.6 m (2 ft) and were near or less than 30,000 cpm at depths greater than 1.5 m (5 ft).

Chemical contamination (metals, BNAEs, TPH) is present in association with the radioactive contamination; concentrations decrease or are below the detection limit at depths greater than 1.5 m (5 ft).

The fifth area of primary contamination surrounds the location of the former thorium processing building. The affected area is approximately 122 by 61 m (400 by 200 ft). Radioactive contamination in this area extends to a depth of 6.7 m (22 ft) in isolated locations. Radioactive contamination in this area is the highest encountered on the property. Downhole gamma log count rate measurements exceeded 1,000,000 cpm immediately adjacent to the building in the near-surface soils and reached a maximum in excess of 3,000,000 cpm in some locations. Radioactive contamination decreases with depth but is present to the maximum depth of investigation in some isolated locations.

Chemical contamination [metals (lithium, cadmium, chromium, arsenic, and lead), BNAEs, TPH] also appears to decrease with increasing depth.

Several boreholes were drilled for chemical sampling and analysis throughout the property, primarily to the east of the former retention ponds and outside of the areas of radioactive contamination. Chemical contamination [metals (primarily lithium), BNAEs, TPH] is present in a significant number of the boreholes. Detection of contaminants is reported primarily along the eastern boundary of the property adjacent to the Stepan Company property

and along the main railroad spur into the MISS property.

4.6 SOIL, RESIDENTIAL VICINITY PROPERTIES OPERABLE UNIT

Data objectives for this operable unit, as described in the field sampling plan, were:

- Objective 1: Determine extent of radioactive surface contamination
- Objective 2: Determine horizontal and vertical boundaries of radioactive subsurface contamination
- Objective 3: Investigate the potential presence of chemical contamination associated with thorium-232 processing operations
- Objective 4: Determine mechanisms of contamination transport
- Objective 5: Determine gamma exposure rate measurements

4.6.1 Evaluation of Radioactive Contaminants

Eight residential properties were investigated during the RI. Seven of these properties had been previously designated for inclusion in FUSRAP, but prior to the RI they had not been characterized to the extent necessary to evaluate remedial action alternatives. The eighth property was investigated because it is located immediately adjacent to one of the burial pits on the Stepan property. Information from previous radiological characterization activities (see Table 1-2) has been considered when drawing conclusions regarding transport mechanisms for the contamination on these properties. Figures 3-18 through 3-20 provide diagrammatic cross sections of Lodi Brook in the area of the Lodi residential and commercial/governmental properties. Overbank sediment deposits from flooding of Lodi Brook during heavy rainfalls and placement of contaminated material as fill are the primary transport mechanisms for contamination on properties in this area. Based on data collected from previous characterization activities, the suspected path of the former channel of Lodi Brook and the location of radioactive contamination can be traced as

shown in Figure 3-17.

70 West Hunter Avenue

This property was investigated because it is immediately adjacent to burial pit 1 on the lawn of the Stepan property and because data gathered while sampling burial pit 1 indicated that contamination might extend onto this property. Near-surface gamma walkover and coneshield data are shown in Figure 4-18. Sampling locations are shown in Figure 4-39. Radiological data are summarized in Tables 4-24, 4-25, and 4-26; complete results are presented in Tables E-1, E-2, and E-3, respectively (Appendix E). Evaluation of all data collected indicated no radioactive contamination on this property.

79 Avenue B

This property was designated for inclusion in FUSRAP based on data collected during a mobile scanning van survey of Lodi (ORNL 1984a) and a followup survey by ORNL (ORNL 1989h). A complete radiological investigation of the property was performed during the RI to determine the extent of contamination. Near-surface gamma walkover and coneshield data are shown in Figure 4-40; sampling locations are shown in Figure 4-41. The results are summarized in Tables 4-24, 4-25, and 4-26; complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables E-4, E-5, and E-6, respectively (Appendix E). The areas of surface and subsurface contamination on this property, based on evaluation of all data collected during the RI, are shown in Figure 4-41.

90 Avenue C

Radioactive contamination identified during a mobile scanning van survey of Lodi (ORNL 1984a) and in a followup radiological survey by ORNL (ORNL 1989d) resulted in designation of this property for inclusion in FUSRAP. During the RI, a complete

radiological investigation and limited chemical investigation of the property were performed. Near-surface gamma walkover and coneshield data are shown in Figure 4-42; Figure 4-43 shows the exterior sampling locations. Results of the radiological investigation are summarized in Tables 4-24, 4-25, and 4-26. Complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables E-7, E-8, and E-9, respectively (Appendix E). The areas of surface and subsurface contamination on this property, based on evaluation of all data collected during the RI, are shown in Figure 4-43. Results of the limited chemical investigation are reported in Section 4.6.2.

There was no indication that contamination extends beneath the residence; however, the kitchen and basement addition at the rear of the residence were identified during the ORNL designation survey as containing contamination.

The original owner of the residence was an employee of MCW, and interviews with family members indicate that he brought discarded building and fill materials to the property from MCW and used them in the construction of the kitchen/basement addition and the ceiling and a wall in an upstairs bedroom. Contamination in these areas probably resulted from using the building and fill materials, which were mixed with concrete to pour the walls. Soil around the unattached garage was also contaminated; however, samples collected from beneath the structure did not indicate contamination.

The interior gamma exposure rates were significantly elevated:

38 $\mu\text{R/h}$ at 1 m (3 ft) above the floor in the kitchen, and 36 $\mu\text{R/h}$ at 1 m (3 ft) above the floor in the basement/foundation addition (Figure 4-44). These measurements exceeded the DOE exposure guideline for the interior of a building or habitable structure (20 $\mu\text{R/h}$ minus average background for the area). Therefore, a time-critical removal action was conducted in July 1991. During this removal action, workers removed the kitchen and basement/foundation addition, a portion of the ceiling and wall in an upstairs bedroom, and two isolated areas of contamination in the garage walls. A portion of the contaminated soil on the property

was also removed to allow the house to be restored on uncontaminated soil. Figure 4-45 shows the radiological status of the property after the time-critical removal action. The contaminated soil and building materials were packaged in appropriate transportation and storage containers and placed in Building 76 at MISS. A post-remedial action report (PRAR) documenting this time-critical removal action is being prepared.

108 Avenue E

This property was designated for inclusion in FUSRAP based on data collected during a mobile scanning van survey of the Lodi area (ORNL 1984a) and a followup radiological survey by ORNL (ORNL 1989e). A complete radiological investigation of the property was performed during the RI. Near-surface gamma walkover and coneshield data are shown in Figure 4-46. Figure 4-47 shows sampling locations, and Tables 4-24, 4-25, and 4-26 summarize sampling results. Complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables E-10, E-11, and E-12, respectively (Appendix E). The areas of surface and subsurface contamination on this property, based on evaluation of all data collected during the RI, are shown in Figure 4-47.

112 Avenue E

This property was designated for inclusion in FUSRAP as a result of data gathered during a mobile scanning van survey (ORNL 1984a) and a followup survey by ORNL (ORNL 1989f). To further determine the extent of radioactive contamination, a full radiological investigation was performed during the RI. Near-surface gamma walkover and coneshield data are shown in Figure 4-48. Figure 4-49 shows the sampling locations on this property; Tables 4-24, 4-25, and 4-26 summarize the data collected. Complete results of soil analyses, downhole gamma logging, and

gamma exposure rate measurements are presented in Tables E-13, E-14, and E-15, respectively (Appendix E). Figure 4-49 shows the areas of surface and subsurface contamination of this property, based on evaluation of all data collected during the RI.

113 Avenue E

This property was designated for inclusion in FUSRAP based on data gathered during a mobile scanning van survey of the Lodi area (ORNL 1984a) and a subsequent followup survey by ORNL (ORNL 1989g).

A full radiological investigation and limited chemical investigation of this property were performed during the RI to further determine the extent of contamination. Near-surface gamma walkover and coneshield data are shown in Figure 4-50. Figure 4-51 shows sampling locations on this property. Tables 4-24, 4-25, and 4-26 summarize the radiological data collected. Complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables E-16, E-17, and E-18, respectively (Appendix E). Areas of surface and subsurface radioactive contamination on this property are shown in Figure 4-51, based on evaluation of all radiological data collected during the RI. Details of the chemical investigation are presented in Section 4.6.2.

62 Trudy Drive

Radioactive contamination was found on this property during a mobile scanning van survey (ORNL 1984a) and a followup radiological survey by ORNL (ORNL 1989a), which resulted in its designation for inclusion in FUSRAP. During the RI, a full radiological investigation and limited chemical investigation were performed to better determine the extent of contamination. Near-surface gamma walkover and coneshield data are shown in Figure 4-52. Sampling locations for that investigation are shown in Figure 4-53. Summaries of the radiological data gathered during the RI are

presented in Tables 4-24, 4-25, and 4-26. Complete results of soil analyses, downhole gamma logging, and gamma exposure rates are presented in Tables E-19, E-20, and E-21, respectively (Appendix E). Figure 4-53 shows the areas of surface and subsurface radioactive contamination on this property, based on the evaluation of all data collected during the RI. Details of the chemical investigation are presented in Section 4.6.2.

136 W. Central Avenue

This property was previously surveyed for radioactive contamination by ORNL (ORNL 1989i) and subsequently designated for inclusion in FUSRAP. A full radiological investigation of the property was performed during the RI. Near-surface gamma walkover and coneshield data are shown in Figure 4-54. Sampling locations are shown in Figure 4-55. Tables 4-24, 4-25, and 4-26 summarize the data collected during the RI. Complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables E-22, E-23, and E-24, respectively (Appendix E).

The property owner relates that the garage and rear sunporch were later additions rather than part of the original structure. Before construction of these additions, the owner's father had placed approximately 2.7 m (9 ft) of fill material at the rear and along the northeast side of the original structure. The origin of the fill material is unknown; however, it is suspected that it came from the MCW property. The locations of radioactive contamination (Figure 4-55) support this theory, as does geologic inspection of the material (i.e., it is of the same type or composition as contaminated fill material found on other contaminated properties at the Maywood Site).

4.6.2 Evaluation of Chemical Contaminants

Twelve soil samples collected from four boreholes at three residential vicinity properties (90 Avenue C, 113 Avenue E, and 62 Trudy Drive) in Lodi were analyzed for metals, rare earths,

PCBs, TPH, and TCLP metals and were tested to determine reactivity and corrosivity (cyanide, sulfide, and pH). Table 4-27 summarizes the number of samples taken from each borehole and the analyses performed. Because TPH concentrations did not exceed 1,000 ppm, samples were not analyzed for priority pollutants (BNAEs, VOCs, and pesticides). Results of analysis for TCLP metals and tests for reactivity and corrosivity did not exceed regulatory limits according to 40 CFR 261. No PCBs were detected.

The metals analysis identified 18 metals at concentrations above mean background (Table 4-28); seven (aluminum, calcium, iron, magnesium, manganese, potassium, and sodium) are common naturally occurring metallic constituents in soils, and their presence and concentrations are not unexpected. Of the remaining 11 metals, seven (arsenic, cobalt, copper, lead, nickel, selenium, and vanadium) were identified as FUSRAP waste because they are present in monazite sand or were identified as uranium analogue metals. Although the source of the metals is unknown, their frequency of coexistence with radioactive contamination suggests that their origin is from thorium processing or another process at MCW from which waste was placed in the same holding ponds as the thorium process wastes. However, given the urban setting of the properties, it is also possible that these metals were transported to their present location as constituents of fill or mulch.

Four rare earth elements (cerium, lanthanum, lutetium, and neodymium), were identified as FUSRAP waste constituents based on their detection in areas of radioactive contamination. These elements were detected at levels significantly above mean background only in areas of radioactive contamination. Table 4-29 summarizes data for rare earth elements in soil at the residential vicinity properties; complete analytical results are presented in Appendix E.

4.7 SOIL, COMMERCIAL/GOVERNMENTAL VICINITY PROPERTIES OPERABLE UNIT

As outlined in the field sampling plan, data objectives for this operable unit were:

- Objective 1: Determine extent of radioactive surface contamination
- Objective 2: Determine horizontal and vertical boundaries of radioactive subsurface contamination
- Objective 3: Investigate the potential presence of chemical contamination associated with thorium-232 processing operations
- Objective 4: Determine mechanisms of contaminant transport
- Objective 5: Determine gamma exposure rate measurements

4.7.1 Evaluation of Radioactive Contaminants

Five commercial/governmental properties were investigated during the RI. Four of these properties had been previously designated for inclusion in FUSRAP; the fifth was investigated because of its location adjacent to burial pit 3 on the Stepan Company property. Information from previous radiological characterizations at the Maywood Site (see Table 1-2) has also been considered in drawing conclusions regarding contaminant transport mechanisms. As discussed in Section 4.6, overbank sediment deposition and fill emplacement in low-lying areas are the transport mechanisms for radioactive contamination on these properties. The diagrammatic cross sections in Figures 3-18 through 3-20 provide detailed information regarding the former channel of Lodi Brook as it relates to the areas of radioactive contamination determined during previous characterization activities in the Lodi area. Commercial properties in the Maywood area, along Route 17, lie directly in the location of the former stream channel or in its floodplain.

200 Route 17 (Sears Repair Center)

This property was identified by aerial survey as being potentially contaminated (EG&G 1981) and was subsequently surveyed by ORNL for radioactive contamination (ORNL 1989j) and designated for inclusion in FUSRAP. This is one of four locations where a

portion of Lodi Brook remains open and above ground. The brook flows along the southeastern corner of the property parallel to Route 17 and appears to be near but not in the exact location of the original channel. The construction of Route 17 and developmental changes to the commercial properties on either side of the highway have resulted in the realignment of the stream channel and construction of a concrete culvert in most of this area. Radioactive contamination on this property was found in the same locations as the open channel of Lodi Brook parallel to Route 17.

During the RI, a full radiological investigation and limited chemical investigation of the property were performed to further determine the extent of contamination. Near-surface gamma walkover and coneshield data are shown in Figure 4-56. Sampling locations for these activities are shown in Figure 4-57. Summaries of the radiological data are shown in Tables 4-30, 4-31, and 4-32. Complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables F-1, F-2, and F-3, respectively (Appendix F). Figure 4-57, which is based on evaluation of all radiological data gathered during the RI, shows the areas of radioactive contamination on this property. Details of the chemical investigation are presented in Section 4.7.2.

Essex Street and State Route 17 (Muscarelle Associates)

Like the property described above, this property was identified by aerial survey (EG&G 1981) as having elevated gamma radiation levels; a followup survey performed by ORNL (ORNL 1989k) resulted in designation of the property for inclusion in FUSRAP. It is suspected that the former channel of Lodi Brook flowed through or immediately adjacent to this property, but the channel is not visible today because of developmental changes to the property and realignment of Lodi Brook. Because the former channel of Lodi Brook is believed to have been located on this property, a GPR survey was performed along the eastern side of the parking lot in an attempt to find the exact location of the former channel. This survey was inconclusive; however, soils typical of stream origin were found in some boreholes. Locations of radioactive contamination on this property were not in the area where the former channel of Lodi Brook is suspected to have been, but those areas on the western side of the property may be in the floodplain of the former channel.

A full radiological investigation of this property was performed during the RI. Near-surface gamma walkover and coneshield data are shown in Figure 4-58. Sampling locations are shown in Figure 4-59. Tables 4-30, 4-31, and 4-32 summarize the results of this investigation. Complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables F-4, F-5, and F-6, respectively (Appendix F). Based on evaluation of all data collected during the RI, areas of radioactive contamination on this property are shown in Figure 4-59.

113 Essex Street (National Community Bank)

This property was also identified by aerial survey (EG&G 1981) as being potentially contaminated and was subsequently surveyed by ORNL (ORNL 1989b) and designated for inclusion in FUSRAP. Because the former channel of Lodi Brook may have flowed through this property, a GPR survey was performed in the eastern end of the parking area at the rear of the building. The survey indicated the location of what appeared to be an stream channel, as well as the

current location of Lodi Brook as it flows through the property enclosed in a culvert. Man-made changes to the property during its development (e.g., grading, addition of fill material) made detection of the exact location of the former stream channel difficult, even with the use of GPR. Radioactive contamination located adjacent to the foundation at the rear of the building and that found in front of the building are located near where the original channel of Lodi Brook has been realigned and is now contained within a concrete culvert.

During the RI, a full radiological investigation and limited chemical investigation of the property were performed. Near-surface gamma walkover and coneshield data are shown in Figure 4-60. Sampling locations are shown in Figure 4-61. Tables 4-30, 4-31, and 4-32 summarize the results of the radiological investigation. Tables F-7, F-8, and F-9 in Appendix F present complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements during the RI. Evaluation of the radiological data indicates contamination in the areas shown in Figure 4-61. The chemical data gathered on this property are discussed in Section 4.7.2.

Interstate 80 (westbound right-of-way)

Data collected by ORNL during a radiological survey (ORNL 1989b) of the property along Interstate 80 resulted in designation of the property for inclusion in FUSRAP. Like the property at 200 Route 17 in Maywood, this property is one of four locations where Lodi Brook is open and above ground in a small area perpendicular to the right-of-way. This location, similar to the one described above, is part of the original channel of Lodi Brook, although much of it has been filled in over the years. According to an employee at the bank located adjacent to this area, the original stream channel was approximately 2.4 to 3.0 m (8 to 10 ft) deep and 4.6 to 5.5 m (15 to 18 ft) wide. The present channel is neither as deep nor as wide. Locations where radioactive contamination was detected on this property lie along either side of the area where Lodi Brook is open and above ground. This area

may at one time have been a part of the original stream channel or its associated floodplain.

During the RI, a full radiological investigation of the property was performed. Near-surface gamma walkover and coneshield data are shown in Figure 4-62; sampling locations are shown in Figure 4-63. Summaries of the data are presented in Tables 4-30, 4-31, and 4-32. Complete results of soils analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables F-10, F-11, and F-12, respectively (Appendix F). Evaluation of all the data gathered during the RI indicates subsurface contamination on this property in the area shown in Figure 4-63.

205 Maywood Avenue (Myron Manufacturing)

This property is currently owned and occupied by a manufacturing company, but historical information indicates that it was at one time occupied by Pfizer Chemical Company. A full radiological investigation of this property was performed during the RI because it is immediately adjacent to burial pit 3 on the Stepan property and because data collected during sampling adjacent to the burial pit indicated the presence of contamination and the potential that it extended onto the property at 205 Maywood Avenue.

Near-surface gamma walkover and coneshield data are shown in Figure 4-64. Figure 4-65 shows the sampling locations for this investigation.

Data collected during the RI are summarized in Tables 4-30, 4-31, and 4-32. Complete results of soil analyses, downhole gamma logging, and gamma exposure rate measurements are presented in Tables F-13, F-14, and F-15, respectively (Appendix F). Areas of contamination, based on evaluation of all data collected, are shown in Figure 4-65.

4.7.2 Evaluation of Chemical Contaminants

Nineteen soil samples, collected from five boreholes on three commercial/governmental vicinity properties (113 Essex Street, 200 Route 17, and 205 Maywood Avenue), were analyzed for metals. Table 4-33 summarizes the number of samples collected from each borehole and analyses performed. Nineteen metals were detected at concentrations above mean background; seven (aluminum, calcium, iron, magnesium, manganese, potassium, and sodium) are common naturally occurring metals in soils and are not unexpected at the concentrations at which they were found. Seven metals (arsenic, cobalt, copper, lead, nickel, selenium, and vanadium) were identified as FUSRAP waste constituents because they are present in monazite sands or because they are uranium analogue elements. Metals were detected in samples collected in radioactively contaminated areas 40 to 75 percent of the time. Metals were also detected at concentrations above measured background in areas immediately adjacent to radioactively contaminated areas (205 Maywood Avenue, borehole C622). The source of many of the metals present is unknown; however, their detection is not surprising given the many years of industrial activity in the area.

Based on TCLP analyses for metals, VOCs, BNAEs, PCBs, herbicides, and pesticides and analyses for reactivity and corrosivity, soil on these properties would not be considered RCRA-hazardous waste according to 40 CFR 261. No PCBs were detected.

At 113 Essex Street (Figure 4-61), two boreholes (C530 and C630) were drilled and sampled for chemical characterization. The TPH concentration in the 1.2- to 1.8-m (4- to 6-ft) interval of borehole C530 was 3,400 mg/kg (the only result at this location that exceeded 1,000 mg/kg). Xylene, the only VOC detected above the reference baseline concentration, was only slightly elevated. Rare earths detected in soil samples from the two boreholes included cerium (maximum of 193 mg/kg), lanthanum (maximum of 137 mg/kg), and neodymium (maximum of 104 mg/kg). TCLP analysis for metals and tests for reactivity and corrosivity indicated that the soil would not be considered a hazardous waste.

At 200 Route 17 (Figure 4-57), two boreholes (C570 and C628) were sampled for chemical characterization. Soil samples from both

boreholes were analyzed for VOCs, BNAEs, metals, rare earths, reactivity, corrosivity, and TPH. Borehole C570 was identified as radioactively contaminated. Two VOCs were detected at concentrations above the levels measured at the reference baseline sampling locations. The shallow sampling interval yielded TPH concentrations of 1,800 mg/kg (borehole C570) and 1,900 mg/kg (borehole C628). Rare earths detected in soil samples from borehole C570 included cerium (maximum of 309 mg/kg), erbium (47.8 mg/kg), lanthanum (maximum of 952 mg/kg), neodymium (maximum of 158 mg/kg), terbium (62.2 mg/kg), and tellurium (644 mg/kg). The only rare earth detected in samples from borehole C628 was thulium (maximum concentration of 204 mg/kg). Results of TCLP metals analysis did not exceed regulatory guidelines according to 40 CFR 261. Based on TCLP analyses for metals, VOCs, BNAEs, PCBs, herbicides, and pesticides and analyses for reactivity and corrosivity, soil on these properties would not be considered RCRA-hazardous waste according to 40 CFR 261. No PCBs were detected.

Tables 4-34 through 4-37 summarize concentrations of metals, rare earth elements, VOCs, and BNAEs detected on the commercial and governmental vicinity properties and compare these results with background and reference baseline concentrations. Complete analytical results for soil samples collected from these properties are presented in Appendix F.

4.8 GROUNDWATER

This section describes the nature and extent of radioactive and chemical contamination in the groundwater of the MISS and Stepan property area. Specific emphasis has been placed on analyzing the relationship between soil contamination and the spatial distribution of contaminants in the groundwater.

Both historical and recent data are presented. Seven years of historical records on contaminant concentrations are available from DOE's ongoing environmental monitoring program, and recent data (fourth quarter 1990 through third quarter 1991) were collected as part of the additional well sampling and analysis portion of the RI. Seven well pairs (MISS-1A and -1B through MISS-7A and -7B)

were installed in 1984 as part of the environmental monitoring program. These wells were located immediately adjacent to the interim storage pile. Four well pairs and eight single wells were installed in 1987 and 1988 (B38W series wells). These wells form the groundwater monitoring network for MISS. Figure 4-66 shows the locations of the wells. Two wells, B38W02D and B38W05B, were drilled offsite to the east. For the purposes of this study, these wells are considered upgradient, and the concentrations of the constituents are baseline for MISS.

The sedimentary section at the site is divided into two units: bedrock, composed of Jurassic/Triassic interbedded sandstone and siltstone, and a surficial unconsolidated sediments unit, composed of interbedded fine-grained natural and sandy gravel glacial/fluviol deposits (see Section 3.4.2). There are no laterally continuous low-permeability sediments separating the upper unit from bedrock; thus, the two discrete geologic units behave as a single interconnected hydrologic system. Minor variations in primary and secondary porosity and permeability in the bedrock result in hydraulic head differences, which have been observed in well pairs. Site-wide, however, the system is interconnected (Section 3.0).

The groundwater radiological and chemical data in the following sections are interpreted through comparative analysis. Radionuclide concentrations are compared with background concentrations in upgradient wells and with DOE DCGs. A DCG is defined as the concentration of a radionuclide in air or water that, under continuous exposure for one year by one exposure mode (e.g., ingestion of water or inhalation), would result in an effective dose equivalent of 100 mrem. Chemical concentrations are compared with the background concentrations in the upgradient wells and with non-zero SDWA Maximum Contaminant Level Goals (MCLGs), existing MCLs, and proposed MCLs.

4.8.1 Evaluation of Radioactive Contaminants

The following discussions and analyses are based on the data in Tables 4-38, 4-39, and 4-40. Concentrations of total uranium,

radium-226, and thorium-232 were measured; these measurements are hereinafter referred to as the standard analyses. Table 4-38 presents the laboratory results of the standard analyses for the 1990 quarterly sampling events; Table 4-39 summarizes average annual concentrations from the standard analyses for the period 1986 through 1990; and Table 4-40 presents the results of additional laboratory analyses for dissolved concentrations of selected radionuclides. In all cases and for all wells sampled, concentrations of radionuclides are approximately equal to or near background concentrations and are an order of magnitude below DOE DCGs.

For 1990, background concentrations of total uranium ranged from 1.0 to 4.0 pCi/L (Table 4-38). In downgradient offsite wells, values were slightly higher, ranging from 1.2 to 7.3 pCi/L. Downgradient onsite wells had values of 0.9 to 8.9 pCi/L, which are similar to levels found in the offsite wells. In all samples from onsite and downgradient wells, concentrations were equal to or near background concentrations and significantly below the uranium DCG of 600 pCi/L.

Background concentrations of total radium-226 ranged from 0.1 to 2.2 pCi/L. Downgradient offsite wells reported comparable values (0.1 to 2 pCi/L). The majority of the values reported from downgradient onsite wells also were within this range; however, the maximum values reported in well MISS-4A were consistently higher (2.3 to 8 pCi/L). All radium-226 concentrations were low (essentially equal to or very near background levels) and were significantly less than the DCG for radium (100 pCi/L) (Table 4-38).

Background concentrations of total thorium-232 ranged from 0.1 to 1.8 pCi/L. Downgradient offsite wells showed values below detection limits, and concentrations in downgradient onsite wells also fell in the lower portion of the background range. The highest concentration (3.0 pCi/L) was reported in a sample from well MISS-4A in the fourth quarter of 1990. All other reported values fell within the background range and are significantly below the DCG of 50 pCi/L (Table 4-38).

Historical data from the standard analyses for 1986 through

1990 are reported in Table 4-39. Concentrations of all constituents during this period were comparable to those in 1990. The highest total uranium concentrations were reported from onsite downgradient wells MISS-4A, -6A and -7B. The highest levels of radium-226 and thorium-232 were reported from well MISS-4A, located in the southwestern corner of the Stepan property. All reported values are significantly below their respective DCGs.

To further characterize the radioactive constituents in groundwater, nine additional wells located on MISS, Stepan, and the DeSaussure properties were added to the routine groundwater monitoring program for the sampling events conducted from the fourth quarter of 1990 through the third quarter of 1991. Samples collected during this period were analyzed for dissolved radionuclide concentrations in addition to the regular total analyses (Table 4-40). Selected samples from upgradient, onsite, and downgradient deep and shallow wells were analyzed for radium-228, thorium-228, and thorium-230, in addition to the standard analyses.

Data are shown as they were reported in data packages. Ideally, results for dissolved analyses should always be equal to or lower than the corresponding total analyses, but such is not always the case because contaminant concentrations are low and generally at or near the detection capabilities of the methods used. Also, detection limits may vary depending on the sample volume and matrix composition and the sensitivity of the instruments. Except for elevated uranium concentrations in well B38W12A, analytical results were comparable to background and were well below DCGs. Uranium concentrations in well B38W12A (located on the DeSaussure property, downgradient of Sears and the Stepan burial pits) ranged from 10.7 to 29 pCi/L. Although these levels are also relatively low, they indicate localized groundwater contamination originating from nearby contaminated soils or the migration of contaminated groundwater originating from the Sears and/or Stepan properties, which are known to be contaminated with uranium, radium-226, and thorium-232. In the majority of the analyses, concentrations are below laboratory detection limits or near background levels. All results are substantially below

respective DCGs.

The data indicate that concentrations of radionuclides in the groundwater are not significantly above background in the immediate vicinity of MISS. It is known that significant concentrations of radioactive materials are present in soils and surface sediments onsite and offsite. Several thorium compounds (e.g., sulfates, chlorides, and nitrates) are soluble, and thorium nitrate was one of the products generated by MCW. The fact that these compounds, which are known to have been at the site, are present in soil but were not detected at significant concentrations in groundwater suggests that they have been stabilized by the sediments underlying MISS.

Sediments in the area are composed of sands, silts, and clays (Section 3.4.2). The middle stratigraphic unit in the unconsolidated sediments unit is composed of clayey silts and sands. The crystal structure of clay materials presents abundant cation exchange sites, which stabilize radionuclides and inhibit their migration via groundwater. Although radionuclides will continue to move through the subsurface as the result of subsequent ion substitution, the rate of migration is substantially less than the groundwater flow velocity. Cation exchange is only one of several processes that can retard the migration of radionuclides; however, it is the primary natural mechanism for stabilizing radioactive materials. No compositional analyses of the sediments have been performed to determine the type and percentage of clays present. However, the geologic descriptions from the soil borings indicate that substantial percentages of fine-grained materials (clays) underlie MISS and the surrounding area.

4.8.2 Evaluation of Chemical Contaminants

Groundwater samples for chemical analyses were collected from the same locations as the radiological samples (Figure 4-66). Samples were collected quarterly, and standard analyses were performed (pH, specific conductance, TOC, TOX, and TAL metals). In addition, analyses for volatile and semivolatile organics were conducted once a year from 1985 through 1991. Detection limits for

metals and organic analytes are listed in Tables 4-41 and 4-42. Indicator parameters such as pH, conductivity, TOC, and TOX are not addressed because they are only gross indicators of ambient water quality. Samples taken during the fourth quarter of 1990 through the third quarter of 1991 were analyzed for total and dissolved concentrations of TAL metals (plus lithium), total and dissolved rare earth metals, and mobile ions (sulfate, nitrate, chloride, and phosphate), in addition to the standard analyses (see Table 4-43).

Organic compounds

Both volatile and semivolatile organic compounds have been detected in groundwater samples from the site. Of the organic compounds detected, the VOCs comprise the largest group. SDWA MCLs for some of the VOCs have been exceeded in various wells, including MISS-1B and MISS-7B (onsite MISS), MISS-4B (Stepan), and well pairs B38W14 and B38W15 (Ballod). Well locations are shown in Figure 4-66. Few semivolatile organics (seven compounds) have been detected in the groundwater samples. Organic compounds have not been detected in the upgradient/background wells (B38W02D and B38W05B).

Groundwater samples for analysis of organic compounds were first collected in 1985. Eleven wells (MISS-1B, -4B, -7B, and MISS well pairs 2, 3, 5, and 6) located on the MISS and Stepan properties were sampled. Volatile and semivolatile organic compounds detected included tetrachloroethene, toluene, trichloroethene, trans-1,2-dichloroethene, methylene chloride, and phthalate. Methylene chloride was detected at concentrations above 100 $\mu\text{g/L}$ in all samples. Bis(2-ethylhexyl)phthalate was detected at concentrations ranging from 53 to 1,200 $\mu\text{g/L}$ in all but two samples. The concentrations of methylene chloride and phthalate that were detected may be indicative of field and/or laboratory cross contamination; therefore, the significance of these data remains questionable. Since 1985, methylene chloride has been detected once in wells MISS-3A and -4B, and phthalate has been detected twice in MISS-6A and once in MISS-6B. Tetrachloroethene

concentrations ranged from 25 to 170 $\mu\text{g/L}$. The only locations with detectable concentrations of tetrachloroethene at later dates were MISS-1B and MISS-7B, and both consistently had concentrations between 10 and 77 $\mu\text{g/L}$. Trichloroethene was detected in MISS-1B at 66 $\mu\text{g/L}$ and in MISS-7B at 9 $\mu\text{g/L}$. Detectable concentrations of trichloroethene are sporadic at later dates and, when detected, range from 2 to 16 $\mu\text{g/L}$. Benzene, toluene, and trans-1,2-dichloroethene were detected in MISS-4B in 1985; trans-1,2-dichloroethene was consistently detected (at lower concentrations) through 1991. Benzene and toluene were detected sporadically. The detection of benzene in MISS-2B is consistent with later results. Detectable concentrations in other wells were generally less than 40 $\mu\text{g/L}$ and were not detected in later years. The following discussions refer to the data collected between 1986 and 1991.

Table 4-44 includes the VOCs detected in groundwater at the site. The compounds most frequently and consistently detected include tetrachloroethene, 1,2-dichloroethene, trichloroethene, benzene, and vinyl chloride.

MCLs exist for ten of the VOCs detected. Six VOCs were detected at concentrations exceeding MCLs; these compounds are listed below. Locations where MCLs were exceeded include onsite MISS wells MISS-1B and MISS-7B; offsite (Stepan) well MISS-4B, located east of MISS; and offsite (Ballod) well pairs B38W14 and B38W15, located west/southwest and downgradient of MISS. The first number in parentheses following the name of the VOC is the maximum detected concentration; the second number is the MCL for that compound (in $\mu\text{g/L}$).

- Onsite MISS Tetrachloroethene (77/5)
 Trichloroethene (16/5)
 Benzene (180/5)

- Offsite (Stepan) 1,2-Dichloroethene (750/100)

Benzene (140/5)
Vinyl chloride (340/2)

- Offsite (Ballod) Tetrachloroethene (640/5)
1,2-Dichloroethene (360/100)
Trichloroethene (150/5)
1,1-Dichloroethene (9/7)
Vinyl chloride (190/2)

Results (1986 through 1991) for onsite MISS wells MISS-1B and MISS-7B have consistently shown detectable concentrations of tetrachloroethene (10 to 77 $\mu\text{g/L}$) and periodic detections of trichloroethene (2 to 6.5 $\mu\text{g/L}$). 1,2-Dichloroethene has been detected periodically in MISS-1B (6.3 to 11 $\mu\text{g/L}$) and consistently in MISS-7B (7 to 40 $\mu\text{g/L}$). Benzene was detected in MISS-2B at 180 $\mu\text{g/L}$ in 1986, decreased to 70 $\mu\text{g/L}$ in 1989, and was not detected in 1990 and 1991.

Ten VOCs have been detected in offsite (Stepan) well MISS-4B. 1,2-Dichloroethene has consistently been detected in this well since 1986. With the exception of 1989, the concentrations of 1,2-dichloroethene ranged from 21 to 180 $\mu\text{g/L}$. In 1989, a much higher concentration of 1,2-dichloroethene was detected (750 $\mu\text{g/L}$).

Vinyl chloride has been detected at concentrations ranging from 340 $\mu\text{g/L}$ in 1989 to 150 $\mu\text{g/L}$ in 1991. Benzene has been detected periodically at concentrations ranging from 23 to 140 $\mu\text{g/L}$. The other seven VOCs were detected only one time between 1986 and 1991, the majority being detected in 1989.

VOCs have been detected in wells located on the Ballod property, offsite and downgradient of MISS. These wells include B38W14S, B38W14D, B38W15S, and B38W15D. Samples have been collected from these wells from 1989 through 1991. As shown in Table 4-45, significant concentrations of several VOCs have been detected in these wells. Concentrations of tetrachloroethene have been reported at 640 $\mu\text{g/L}$ (well B38W14S), 500 $\mu\text{g/L}$ (well B38W14D), and 570 $\mu\text{g/L}$ (well B38W15D). Vinyl chloride (190 $\mu\text{g/L}$) and

1,2-dichloroethene (360 $\mu\text{g/L}$) were reported in well B38W15S. Toluene (470 $\mu\text{g/L}$) and trichloroethene (150 $\mu\text{g/L}$) were reported in well B38W15D.

VOCs including tetrachloroethene, trichloroethene, and dichloroethene were consistently detected in well B38W14S from 1989 through 1991; dichloroethene and vinyl chloride were consistently detected in well B38W15S. Most of the compounds detected in well B38W14S were also detected in wells B38W14D and B38W15D (Table 4-45); however, detection of the compounds in these wells was temporally sporadic. The compounds were detected at substantial concentrations in 1989 and were either nondetectable or detected at greatly reduced concentrations in 1990 and 1991. Concentrations of organic compounds in these wells exhibited significant variation between sampling events.

Concentrations of other VOCs (benzene, toluene, xylenes, carbon disulfide, methylene chloride, chloroform, and ethylbenzene) detected in groundwater at the site were generally variable, and their occurrence was sporadic both temporally and spatially.

Few semivolatile organics (seven compounds) have been detected in groundwater samples. Semivolatiles were detected in three onsite MISS wells (MISS-2B, MISS-6A, and MISS-6B), one offsite north well (B38W01S), and three offsite (Stepan) wells (MISS-3A, B38W3B, and MISS-4B). As shown in Table 4-44, detection of these compounds was sporadic; most semivolatiles were detected in 1989, and none of the compounds are prevalent.

All organic compounds detected at significant levels are halogenated solvents (commonly used as degreasers), dry cleaning agents, or chemical intermediates.

Currently, no documentation is available to associate organic constituents with the thorium process; however, integration of the soils data shows that hydrocarbons and semivolatile organics are commonly found in association with radioactive contamination. The elevated levels appear to be correlated (i.e., increased concentrations of semivolatile organics and hydrocarbons were observed to coexist with increased levels of radioactive constituents). The data indicate that the retention ponds were

used by the former chemical process facility for multiple purposes; to distinguish one pond from another is not feasible.

Mobile ions

Analyses were performed for mobile ions (chlorides, nitrates, phosphates, and sulfates) that are likely to have been constituents of substances used or produced by MCW (see Section 1.3). Results of these analyses are presented in Table 4-47. Concentrations of chlorides, nitrates, and phosphates observed at onsite and downgradient sampling locations are comparable to upgradient results. The analytical results for these ions are well within expected groundwater concentrations. Concentrations of sulfates, however, were elevated at most sampling locations. The concentrations and distribution of sulfate in the groundwater are discussed in the following section with results for metals.

Metals

Groundwater samples taken from the fourth quarter of 1990 through the third quarter of 1991 were analyzed for dissolved and total metal content. Analyses for dissolved and total rare earth metals also were performed. Samples for dissolved metals analysis were field-filtered through a 0.45-micron membrane filter. Data tables presenting results of these analyses are provided in Appendix H.

To determine whether any metals were present at concentrations indicative of releases to the environment or at concentrations potentially harmful to human health and the environment, comparisons were made with MCLGs and existing and proposed MCLs. Arsenic and chromium, which commonly are elevated in site soils, were detected at concentrations exceeding the above criteria and are discussed below. Table 4-46 lists these analytes and the wells in which they were detected. Although MCLGs and MCLs do not exist for boron and lithium, these metals were included in the table because of the consistency and extent of their detection at levels significantly above background concentrations. Additional heavy metals, including cadmium, antimony, beryllium, and lead, have been detected at levels above MCLs and MCLGs; however, these detections are sporadic and generally at estimated concentrations. Background concentrations reported from well B38W02D were generally near or below laboratory detection limits.

Groundwater samples were collected from wells completed in bedrock and wells completed in the overburden. The data base for metals concentrations in the groundwater in the unconsolidated sediments is limited because of the shallow well depths and thin saturated thickness, which result in insufficient water volume for sampling. Of seven onsite MISS and Stepan shallow wells, only three or four were sampled during each quarter. Constituent concentrations, distribution and correlation of the metals data, and data for sulfates are summarized below.

Arsenic and Chromium. Arsenic and chromium concentrations are elevated in MISS-2A, which is located in the northern portion of the site, and are elevated to a lesser degree in wells to the southwest. Total and dissolved arsenic concentrations at MISS-2A range from 2,310 to 6,310 $\mu\text{g/L}$. With the exception of MISS-3A, concentrations in groundwater in the unconsolidated sediments at downgradient locations are generally two orders of magnitude lower, with estimated concentrations ranging from 5 to 38 $\mu\text{g/L}$. Estimated arsenic concentrations up to 266 $\mu\text{g/L}$ have been reported at MISS-3A. At downgradient and offsite (Ballod) locations, arsenic was generally not detected. At two of these locations (B38W14 and

B38W17), downgradient and offsite, arsenic was periodically reported at estimated concentrations between 6 and 12 $\mu\text{g/L}$.

Arsenic is typically detected in groundwater in the bedrock at location MISS-7B. The maximum total concentration detected was 137 $\mu\text{g/L}$, with 43 $\mu\text{g/L}$ in the dissolved fraction. Periodically, arsenic is detected at MISS-5B at concentrations less than 30 $\mu\text{g/L}$.

Concentrations at offsite downgradient locations were typically less than 5 $\mu\text{g/L}$.

Concentrations of chromium in groundwater in the unconsolidated sediments ranged from 26 to 365 $\mu\text{g/L}$ at MISS-2A, generally ranged from 10 to 20 $\mu\text{g/L}$ at MISS-6A, were nondetectable at MISS-7A and MISS-5A, and generally were between 100 and 1,000 $\mu\text{g/L}$ at offsite locations B38W17A and B38W14S. The total and dissolved concentrations are similar at MISS-2A; however, the dissolved fraction is nondetectable at offsite locations.

In the northeastern areas of MISS and Stepan (wells MISS-2B, B38W02D, B38W05D, and B38W18D), chromium was detected in groundwater in the bedrock at concentrations ranging from 9 to 265 $\mu\text{g/L}$. The concentration in the dissolved fraction was typically less than 18 $\mu\text{g/L}$. Chromium in the groundwater from the other wells on MISS and Stepan was periodically detected at concentrations between 4 and 12 $\mu\text{g/L}$, but was typically nondetectable. Offsite and downgradient, concentrations were similar, with periodic detections from 6 to 21 $\mu\text{g/L}$. Results for the third quarter of 1991 show an anomalously high concentration of total chromium (121 $\mu\text{g/L}$) in well B38W14D; however, soluble chromium was not detected. Data from the other three quarters showed total chromium concentrations at or less than 11 $\mu\text{g/L}$.

Sulfate, lithium, and boron. Elevated concentrations of sulfate, lithium, and boron were detected in the majority of the onsite MISS wells and in some of the offsite wells on the Stepan and Ballod properties. As shown in Figures 4-67 through 4-69, sulfate, lithium, and boron correlate in occurrence and concentration. Elevated concentrations of these constituents occur

in the northern area near MISS-2, B38W18D, and B38W01S; in the southwestern portion of MISS, near MISS-7, MISS-6, and MISS-5; and in wells on the offsite Ballod property (B38W15, and B38W17). Representative concentration ranges in groundwater in the bedrock are shown in Figures 4-67 through 4-69, and actual concentrations are presented in Tables 4-46 and 4-47. Constituent concentrations are generally higher in the groundwater in the bedrock than in the unconsolidated sediments.

Concentrations of sulfate were generally highest in the bedrock wells (approximately 3,000 $\mu\text{g/L}$) in the northern area near MISS-2B, decreasing to approximately 1,500 $\mu\text{g/L}$ in the southwestern area (MISS-7B, MISS-5B, and B38W03B) and decreasing to 600 to 800 $\mu\text{g/L}$ in the offsite Ballod area. Concentrations in the shallow wells exhibit the same trend, but at lower concentrations (approximately 1,400 $\mu\text{g/L}$ in the northern area, from 200 to 1,000 $\mu\text{g/L}$ in the southwestern area, and from 100 to 500 $\mu\text{g/L}$ in the offsite Ballod area).

Concentrations of lithium in the bedrock ranged from approximately 2,500 to 16,000 $\mu\text{g/L}$ in the northern area; from 200 to 17,000 $\mu\text{g/L}$ in the southwestern area; and from 1,000 to 3,700 $\mu\text{g/L}$ at the offsite Ballod property. Concentrations of lithium in the overburden have been reported at 6,700 $\mu\text{g/L}$ at MISS-2A; range from 900 to 12,200 $\mu\text{g/L}$ in MISS-6A and MISS-5A, respectively; and range from 300 to 14,000 $\mu\text{g/L}$ at offsite Ballod locations B38W17A and B38W15A.

Boron concentrations in groundwater range from 3,200 to 4,390 $\mu\text{g/L}$ in the bedrock and from 500 to 900 $\mu\text{g/L}$ in the overburden in the northern portion of the area. Concentrations in the southwestern portion and downgradient offsite area exhibit similar concentrations in both the bedrock and overburden.

In addition, samples from well B38W04B show elevated concentrations of lithium and boron, but low concentrations of sulfate. Samples from B38W06B have relatively low concentrations of boron and sulfate and moderately elevated concentrations of lithium.

The elevated concentrations on the MISS and Ballod properties are related to the former retention ponds in the area. Historic records indicate that the dike area of one of the northern retention ponds was used for disposal of lithium wastes and that the dike area of one of the southern retention ponds was used for disposal of lithium and thorium wastes. The lithium concentrations detected in B38W06B are likely related to former retention pond "F."

Rare earths. Analyses for rare earth metals were performed because they are known to be present in the monazite sands used in thorium processing operations at MCW. Table H-2 (Appendix H) presents the results of these analyses. The detection limit for all analytes is 200 $\mu\text{g/L}$.

Several rare earths were detected at MISS and Stepan, but there were few obvious locational groupings, and no rare earths were prevalent in either deep or shallow wells. The only obvious association between rare earths detected in groundwater and a localized source area within MISS is the fairly consistent appearance of cerium, lanthanum, and neodymium in samples from well B38W18D, which is located immediately downgradient of the former thorium processing area. The same three rare earths were consistently detected in soil samples from this area.

Summary. Dissolved metals appear to be localized in the immediate areas where soil contamination is elevated. In some cases, filtration of the groundwater samples significantly decreased the concentrations of metals. This would indicate that metals are being transported by colloidal-sized particles (larger than 0.45 microns) that are suspended in the groundwater. Thus, the lack of significant migration can be explained by the observation that the unconsolidated sediments underlying the site contain a substantial quantity of clay-sized particles. These fine-grained materials tend to act as a mechanical filter and retard contaminant flow via the groundwater. The total and dissolved concentrations of lithium and boron are generally similar, which indicates that these constituents are being transported in solution.

Groundwater conclusions

Findings are summarized as follows:

- All reported values for radioactive constituents in groundwater are significantly below their respective DCGs.
- The source of the onsite organic contamination is likely associated with the former retention ponds.
- Currently, no documentation is available to associate organic constituents with the thorium process; however, integration of the soils data shows that hydrocarbons and semivolatile organics are commonly found in association with radioactive contamination. The data indicate that the retention ponds were used by the former chemical process facility for multiple purposes; to distinguish between one pond and another is not feasible.
- The results for total and dissolved concentrations of arsenic and chromium and the distribution of these constituents in the groundwater appear to reflect localized sources associated with contaminated soils. Significant offsite migration of these constituents is not apparent.
- With the exception of sulfate, the concentrations of mobile ions are within background ranges.
- Elevated concentrations of sulfate, lithium, and boron in the groundwater indicate two primary source areas: (1) the northern portion of the site near MISS-2, (which includes former retention pond A and the area of contaminated soils east of the former retention pond in the vicinity of Building 76); and (2) the former retention ponds in the southwestern portion of MISS and on the Ballod property.

- It appears that several contaminants are associated with the former retention ponds. While a primary source (process waste and soil) has been removed from Ballod, no definitive data are available to determine whether the constituents and concentrations detected in offsite groundwater originated from MISS or from previous or residual contamination at Ballod. However, due the hydrogeologic conditions, the contaminants found in groundwater in the bedrock at Ballod were probably introduced in the eastern portion of Ballod or upgradient of Ballod.

To aid in the delineation of the nature and extent of contamination entering and exiting MISS, additional monitoring locations have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan.

4.9 SURFACE WATER

This section describes the nature and extent of contamination in surface water potentially affected by runoff from MISS and Stepan. Data presented have been obtained from the ongoing environmental surveillance program at MISS, for which surface water samples were collected quarterly at sampling locations established on the basis of potential contaminant migration routes and discharge points from the site. Sampling location 3 is located upstream to establish background conditions, and locations 1, 2, and 4 are located downstream to determine the impact of any runoff from the site on the surface water migration pathways in the vicinity (see Figure 2-1).

4.9.1 Evaluation of Radioactive Contaminants

Based on the contaminants known to be present on MISS, quarterly environmental monitoring includes analysis of surface water samples for total uranium, radium-226, and thorium-232. Table 4-48 presents results for 1990. Annual concentrations of total uranium averaged less than 3 pCi/L at both upstream and

downstream locations. The absence of elevated levels at downstream locations indicates that uranium is not migrating at significant concentrations via surface water. Total uranium concentrations were well below the uranium DCG of 600 pCi/L.

The annual average concentration of radium-226 was 0.3 pCi/L at the upstream location and ranged from 0.3 to 0.4 pCi/L at downstream locations. Radium-226 concentrations remained close to background throughout the year and were well below the radium DCG of 100 pCi/L.

Annual concentrations of thorium-232 averaged less than 0.1 pCi/L at both upstream and downstream locations. All concentrations remained close to background throughout the year and were well below the thorium DCG of 50 pCi/L.

Table 4-49 compares annual average radionuclide concentrations measured in surface water from 1986 through 1990. The expected value ranges shown are based on calculation of standard deviation of the annual average concentrations. The expected range provides an indication of a trend in the data. If the range varies significantly from location to location, or if a location consistently falls outside the expected range, then a trend could be present. In general, the ranges were low and fairly consistent between data sets. Quarterly results for 1990 were within the expected range of values.

To further characterize radioactive contamination in surface waters associated with MISS, all samples taken from the fourth quarter of 1990 through the third quarter of 1991 were analyzed for dissolved radionuclide concentrations in addition to the regular total analyses. These samples were also analyzed for radium-228, thorium-228, and thorium-230 to determine compliance with the DCGs for those radionuclides in water. The differences between the dissolved and total analytical results are minimal (Table 4-50). Because results of both analyses are usually below or very near the analytical detection limits, it is impossible to determine whether any radionuclides present are dissolved (able to pass through a 0.45-micron membrane filter). The concentration ranges are similar to the 1990 data in Table 4-48, further indicating that radionuclides on MISS and Stepan are not migrating offsite via the surface water pathway.

4.9.2 Evaluation of Chemical Contaminants

Surface water samples for chemical analyses were collected from the same locations as the radiological samples (Figure 2-1). Chemical sampling was initiated during the third quarter of 1990. The samples were analyzed for indicator parameters (pH, specific conductance, TOC, TOX, and mobile ions) and for TAL metal content.

In addition, volatile and semivolatile organics analyses were performed once in the third quarter of 1990. Miscellaneous parameters such as pH, conductivity, TOC, and TOX were not addressed because of the natural variability of surface water chemistry.

Organic compounds

Four VOCs were detected in third-quarter surface water samples (Table 4-51). Chloroform was detected at the upstream location at a concentration of 7 $\mu\text{g/L}$, and 1,2-dichloroethene (38 $\mu\text{g/L}$), trichloroethene (13 $\mu\text{g/L}$), and 1,1,2,2-tetrachloroethane (42 $\mu\text{g/L}$) were detected at downstream location 2. The presence of these compounds suggests that other industrial processes may have introduced contaminants into the watershed in the Maywood area. No semivolatile compounds were detected.

Metals

Samples from the fourth quarter of 1990 through the third quarter of 1991 were analyzed for dissolved and total metal content and dissolved and total rare earth elements (Tables 4-52 and 4-53).

Samples for analysis of dissolved metals were obtained by filtration through a 0.45-micron filter. As can be seen in Table 4-52, the only metal found at concentrations exceeding existing MCLs was lead, which was detected once at 428 $\mu\text{g/L}$ in a sample from the upgradient sampling location. The source is probably farther upgradient of MISS. The only metals detected regularly in surface water associated with MISS and Stepan were calcium, iron, lithium, potassium, magnesium, manganese, sodium, and zinc. Except for lithium, all of these metals are natural components of surface waters; downgradient concentrations were comparable to those upgradient, indicating little or no site contribution. Lithium was not detected upgradient but was found downgradient at concentrations up to 620 $\mu\text{g/L}$.

Lithium-contaminated soils on MISS or within the MISS/Stepan watershed are the probable sources for this migration, which extended to sampling location 2 (Figure 2-1). Another possible source is groundwater seepage into an underground culvert that conveys Westerly Brook under MISS. A BRA is being prepared to investigate lithium in surface water and its impact on human health and the environment.

The only rare earth metal detected in surface waters associated with MISS is thulium (Table 4-53), which was detected once at the

upstream sampling location. This evidence indicates that surface water at MISS is not currently a pathway for the offsite transport of rare earth elements.

Mobile ions

The results of mobile ion analyses are shown in Table 4-54. Levels of chlorides, nitrates, phosphates, and sulfates were generally low, and downstream concentrations were comparable to levels found upstream. These mobile ions appear to be uniformly distributed throughout the watershed; concentrations are below drinking water standards.

4.10 SEDIMENTS

This section describes the nature and extent of contamination in sediments potentially affected by runoff from MISS and Stepan. Data presented have been obtained from the ongoing environmental surveillance program at MISS, for which sediment samples were collected quarterly at surface water sampling locations when sediment was present. Sampling location 3 is located upstream to establish background conditions; locations 1, 2, and 4 are located downstream to determine the extent of sediment deposition downstream from MISS (Figure 2-1).

4.10.1 Evaluation of Radioactive Contaminants

Based on the contaminants known to be present at MISS (see Section 1.3), sediment samples were analyzed for total uranium, radium-226, and thorium-232. Table 4-55 presents sediment sampling results for 1990.

Currently, no DCGs exist for radionuclides in sediment; therefore, sediment concentrations of radium-226 and thorium-232 are compared with the FUSRAP soil guidelines of 5 pCi/g. Soil guidelines for uranium have not yet been determined for MISS.

As seen in Table 4-55, the annual average concentration of total uranium was 1 pCi/g at all locations except for location 4,

where the average concentration was 1.3 pCi/g. The annual average concentration of radium-226 was 0.5 pCi/g at the upstream location (background) and ranged from 0.4 to 0.5 pCi/g at downstream locations. Uranium and radium-226 concentrations downgradient remained equal to or very near background throughout the year, and radium-226 concentrations were below the FUSRAP soil guidelines.

The annual average concentration of thorium-232 was 0.3 pCi/g at the upstream location and ranged from 0.5 to 0.7 pCi/g at downstream locations. Although thorium-232 concentrations downstream were slightly higher than upstream concentrations, they remained close to background concentrations and below the FUSRAP soil guidelines.

Table 4-56 compares annual average radionuclide concentrations measured in sediment from 1986 through 1990. The expected value ranges shown are based on calculation of the standard deviation of the annual averages. All annual average concentrations of total uranium, radium-226, and thorium-232 in sediment for 1990 were within the expected ranges; levels have remained fairly constant and below DOE guidelines over the past 5 years.

These results correlate well with surface water sampling results. Historically, surface water associated with the MISS area has been the primary carrier of radioactive contaminants (i.e., Lodi Brook). However, the contaminants still present in surface soils on MISS and Stepan now seem to be relatively immobile from the standpoint of surface water runoff. As long as the various protective coverings (asphalt, Hypalon, and vegetation) are not disturbed, this should continue to be the case.

Sediments were further characterized for radioactive constituents by collecting samples from the fourth quarter of 1990 through the third quarter of 1991 and analyzing these samples for radium-228, thorium-228, thorium-230, total uranium, radium-226, and thorium-232. Table 4-57 presents the results of these analyses, which were consistent with previous results and were below DOE guidelines for soils. Sediment samples taken downgradient of MISS exhibited no apparent increase in radioactivity.

4.10.2 Evaluation of Chemical Contaminants

Chemical characterization of the sediments at MISS was conducted within the environmental monitoring program during the fourth quarter of 1990 through the third quarter of 1991. Sediment samples were analyzed for TAL metals, rare earth elements, and mobile ions. These data are presented in Tables 4-58, 4-59, and 4-60.

Metals

Metals detected in sediments (Table 4-58) correlate with the results for surface water metals (Table 4-52). The various common elements were detected at concentrations indicative of natural conditions, with downstream results similar to those obtained from the upstream locations. Therefore, neither MISS nor Stepan appears to be contributing metals to sediments in the vicinity. Lithium was detected in surface water downstream from MISS but not in sediments. This finding, along with the filtered surface water results demonstrating the high solubility of lithium, further suggests that much of the lithium migrating from MISS reaches the Saddle River.

In analyses for rare earths (Table 4-59), lanthanum and lutetium each were detected once (during the second quarter of 1991) at location 2, which is immediately downstream from MISS (Figure 2-1). Although rare earths can be linked to thorium wastes because they were present in monazite sands used at MCW, the significance of these isolated single detections is questionable. Lanthanum and lutetium, which were detected only once, were the only rare earths detected in sediments, and rare earths were not detected at all in downstream surface water samples.

Mobile ions

As in surface water, the concentrations of mobile ions detected in sediments are all relatively low (Table 4-59), reflecting the natural chemistry of the sediments in the vicinity of MISS and Stepan. Furthermore, concentrations detected downgradient are comparable to those detected upgradient, indicating that MISS and Stepan are having little or no impact on mobile ion concentrations in downstream sediments.

4.11 AIR

This section describes the nature and extent of radioactive gaseous emissions and gamma exposure rates on and around MISS. Resuspension and deposition of particulate contaminants were not evaluated because the contaminants at MISS are stable with respect to these pathways. The site is almost entirely covered with vegetation or asphalt, and the storage pile is covered with Hypalon.

The following sections present data obtained from the ongoing environmental monitoring program at MISS. Radon detectors and gamma exposure rate dosimeters are positioned and continuously operated at 2 onsite, 10 fenceline (property boundary), and 3 offsite (background) locations. Onsite and fenceline detector locations are shown in Figure 4-70. Detectors are positioned along the site boundary to ensure adequate monitoring of radiological conditions and their impact on the surrounding environment.

In addition to the routine environmental monitoring, radon and thoron flux rate measurements were performed in July 1990 and May 1991, respectively. These measurements were performed to determine the degree of homogeneity of radium and thorium within the pile and throughout MISS and to determine their ability to migrate through the soil matrix.

4.11.1 Radon Monitoring

The maximum ambient radon concentration detected was 2.8 pCi/L

(including background) at location 5. The annual average concentrations ranged from 0.3 to 2 pCi/L (including background) (see Table 4-61). No annual average concentration at the fenceline exceeded the radon DCG of 3.0 pCi/L.

Annual average radon concentrations measured from 1986 through 1990 are compared in Table 4-62. Except for locations 5 and 10 (Figure 4-70), 1990 annual average radon concentrations at MISS were within expected concentration ranges; standard deviations were consistent between monitoring locations, indicating that radon concentrations varied only moderately over time, with no statistically significant increase at the site.

During the past 5 years, there has been an observable downward trend in radon concentrations at locations 5 and 10. The downward trend at location 5 resulted from placement of additional fill material in this area in the fall of 1987. The cause of the downward trend at location 10 is not known.

4.11.2 Radon and Thoron Flux Monitoring

In July 1990, thoron flux measurements were made at 29 evenly spaced locations on the MISS storage pile. The average thoron flux was 0.374 pCi/m²/s, with minimum and maximum flux rates of 0.003 and 0.490 pCi/m²/s, respectively.

The results of radon flux monitoring on the MISS storage pile in May 1991 demonstrated that the average radon flux was 0.12 pCi/m²/s, with minimum and maximum rates of 0.02 and 1.76 pCi/m²/s, respectively. The MISS pile is in compliance with the limit of 20 pCi/m²/s (an averaged value) specified in 40 CFR 61, Subpart Q.

Radon flux measurement locations at MISS are shown in Figure 4-71. The average radon flux rate was 1.29 pCi/m²/s. The minimum and maximum rates measured were 0.02 and 36.7 pCi/m²/s, respectively. Of the 192 locations measured, 5 yielded radon flux rates above 20 pCi/m²/s. (These five locations were all located within the shaded region near Building 76 shown in Figure 4-72.) These higher radon flux measurements correspond to higher radium and thorium concentrations detected in soil samples from the same area. Comparison of these results with other corresponding flux rate/soil concentration data sets indicates that the radium and thorium concentrations in the upper 15 cm (6 in.) of the soil matrix at these five locations are greater than at other locations, resulting in the higher flux measurements that were observed.

4.11.3 External Gamma Radiation

Table 4-63 presents the results of external gamma radiation monitoring. The annual average exposure rate at MISS in 1990 was 27 mR/yr onsite and 58 mR/yr at the fenceline. These exposure rates do not include the average background exposures of 68 mR/yr for the Maywood area. The higher exposure rate at the fenceline probably reflects the distribution of contaminated surface soils at MISS.

Figure 4-73 compares the average annual external gamma exposure rates for locations onsite and at the site fenceline with local and average national background rates. Although the external gamma radiation exposure rate at MISS is slightly elevated when compared with the annual average gamma exposure rate, it does not present a health threat to the public. To verify that MISS was in compliance with the DOE public dose limit of 100 mrem/yr above background through all exposure modes from all DOE-controlled sources of radiation, the potential radiation dose was calculated for a hypothetical maximally exposed individual and for the population within 80 km (50 mi) of the site. Details of this calculation can be found in the 1990 annual site environmental report (BNI 1991a).

Based on a conservative scenario, this hypothetical individual would receive a dose of approximately 1.3 mrem/yr above background.

The population within an 80-km (50-mi) radius of MISS would receive a collective population dose of 2.5 person-rem/yr above background.

Table 4-64 compares annual average external gamma exposure rates measured from 1986 through 1990. Although measurements at some locations are consistently higher or lower than at others, the only potential trend is the apparent decrease in annual averages from 1987 to 1989 calculated for location 10. The cause of this potential trend is not known. Annual average exposure rates at all other monitoring locations exhibit only slight variation caused by fluctuation in natural background exposure rates and the accuracy and precision limitations associated with tissue equivalent thermoluminescent dosimeters (TETLDs) when measuring low rates of exposure.

FIGURES FOR SECTION 4.0

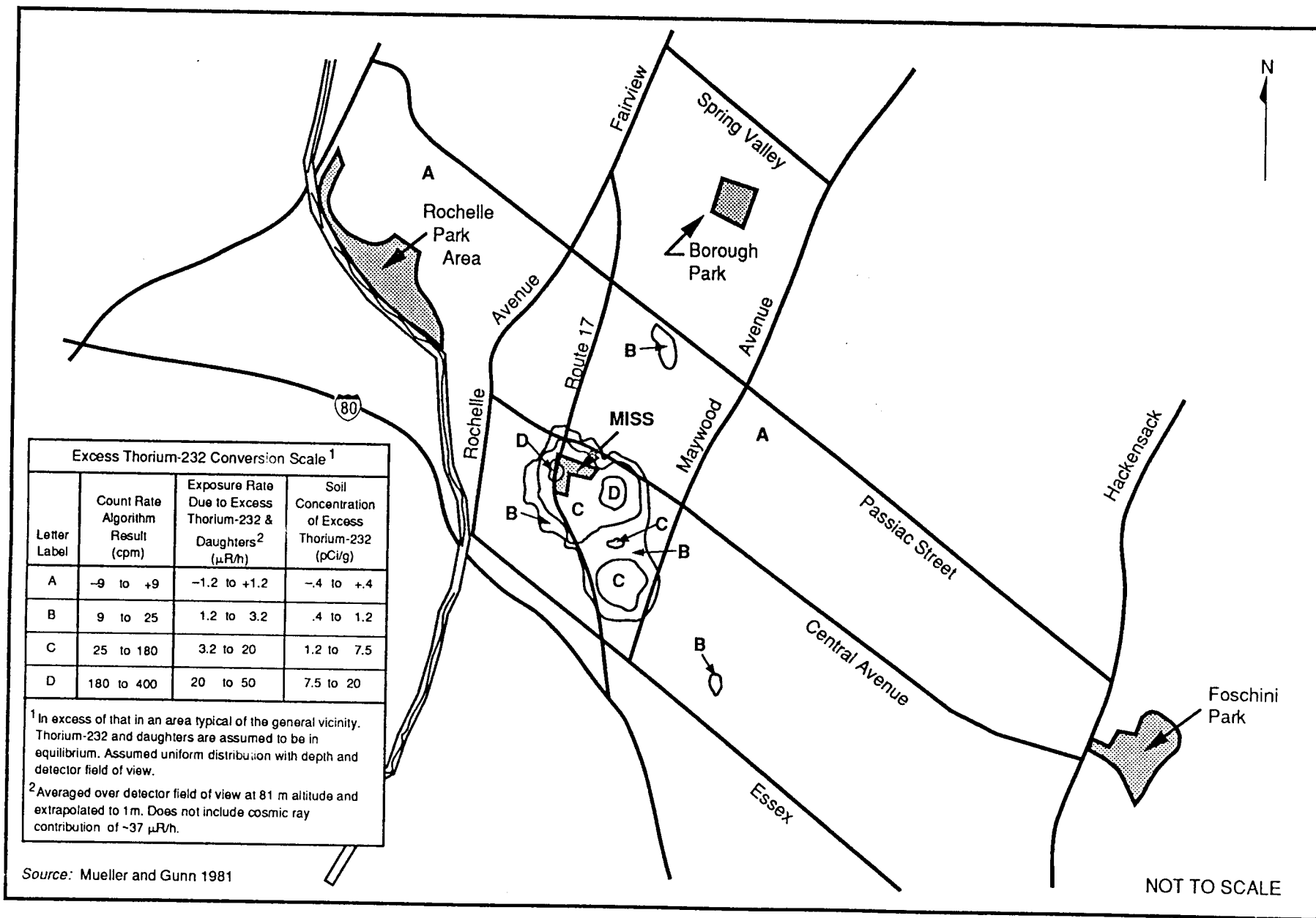
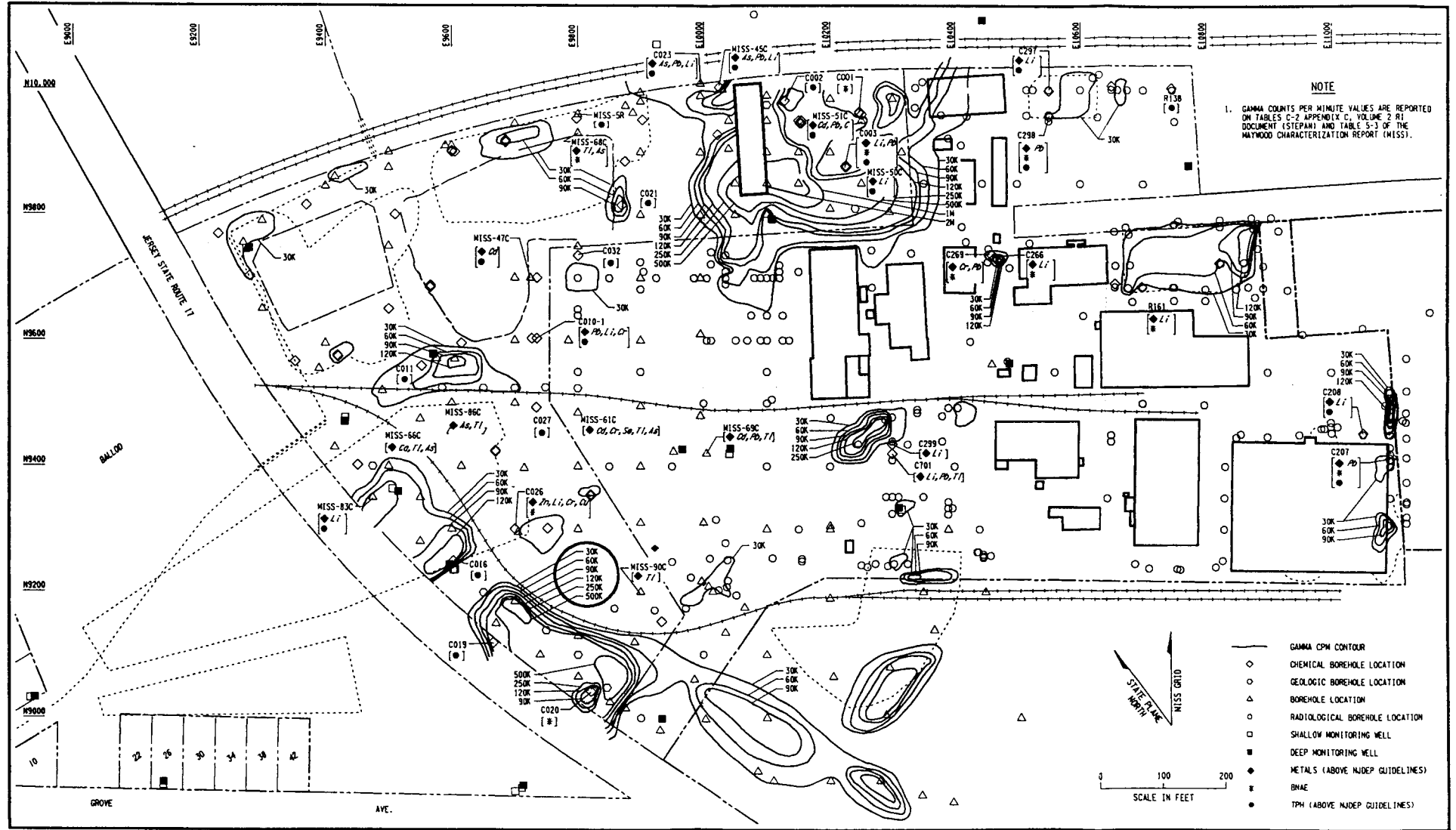
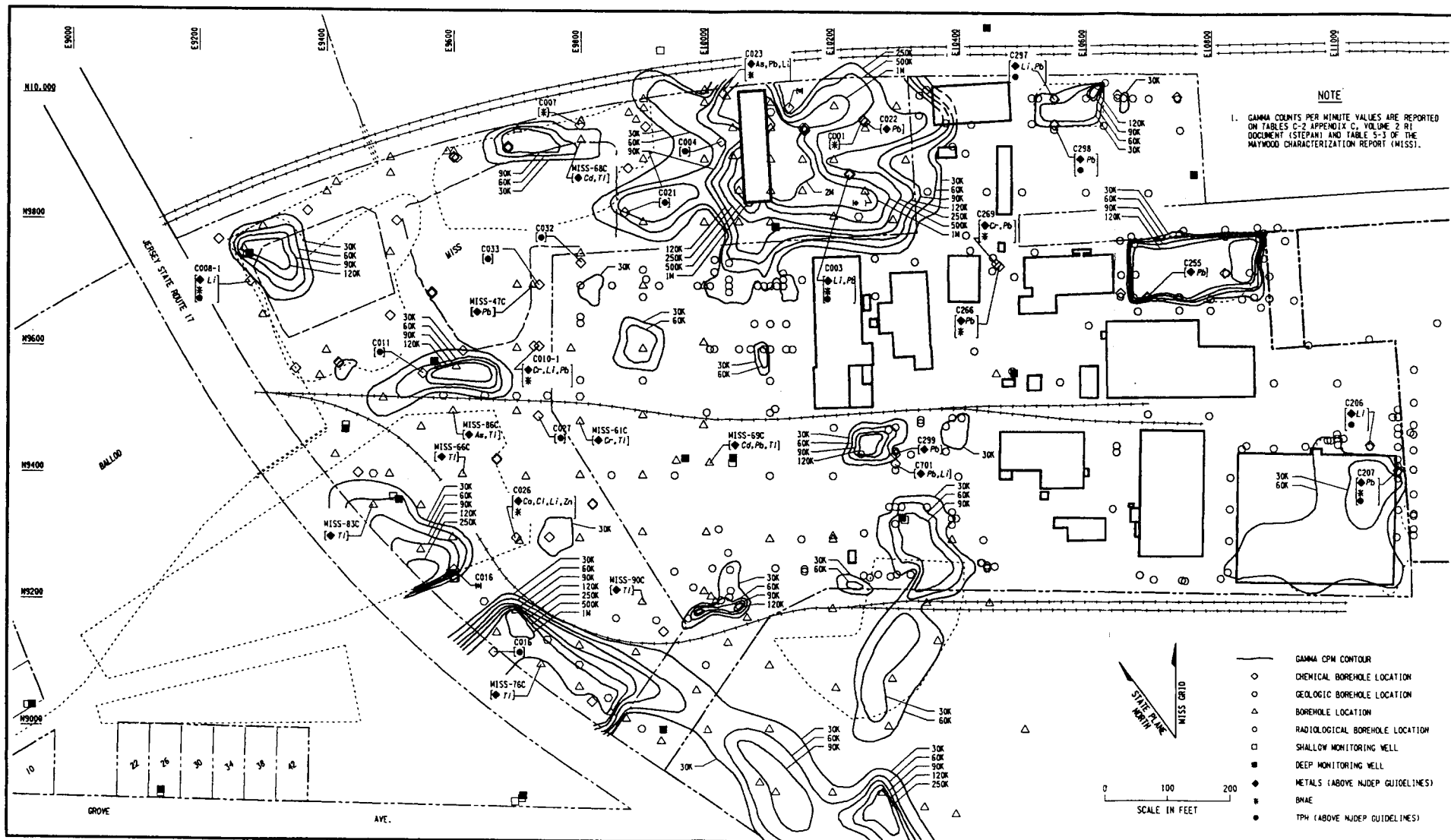


Figure 4-1
Background Sampling Areas in Relation to MISS



RO1F0748.DGN

Figure 4-2
Summary Map of Contaminant Distribution, 0-1 ft



R01F0738.DGN

Figure 4-3
Summary Map of Contaminant Distribution, 1-2 ft

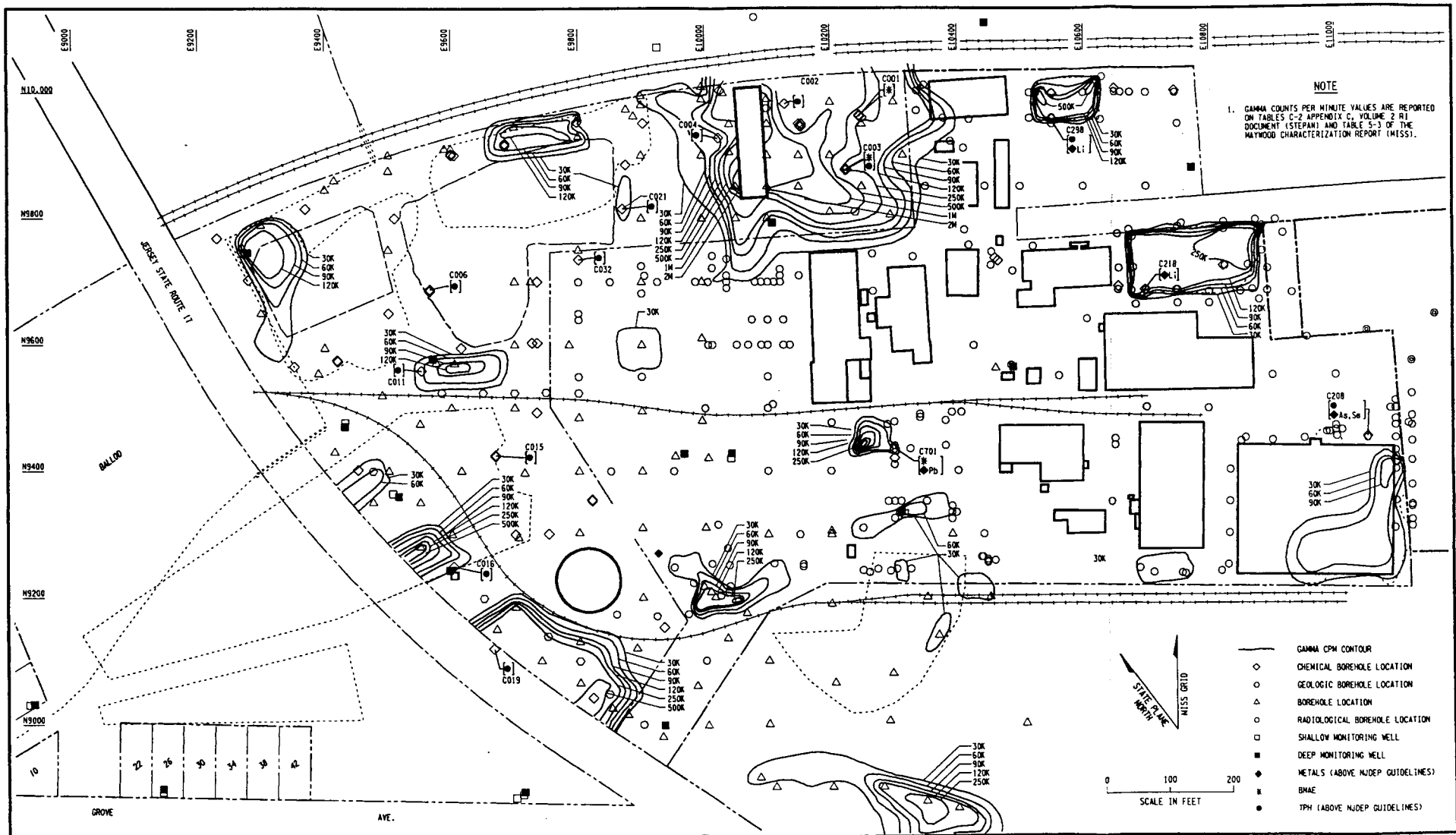
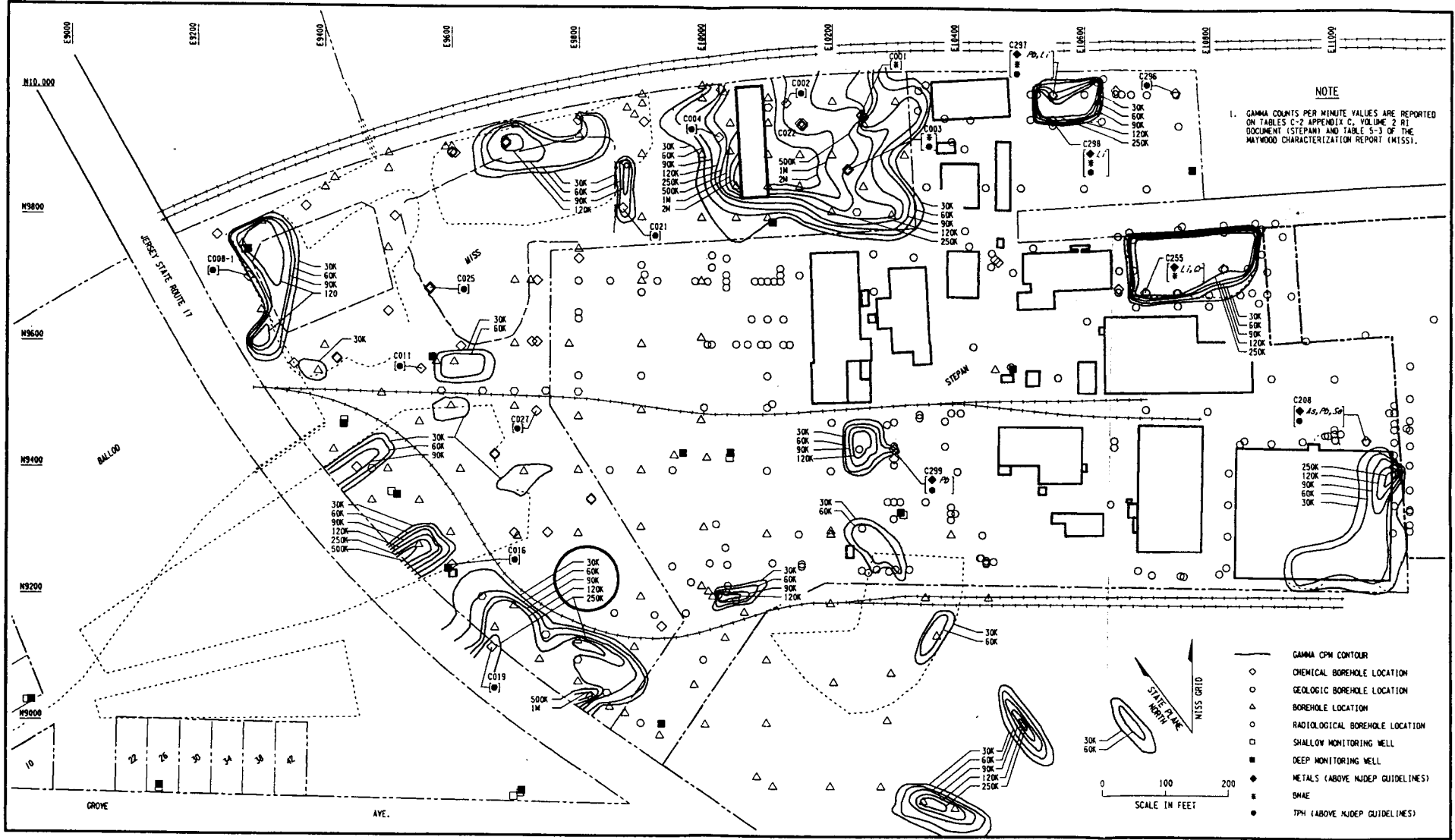
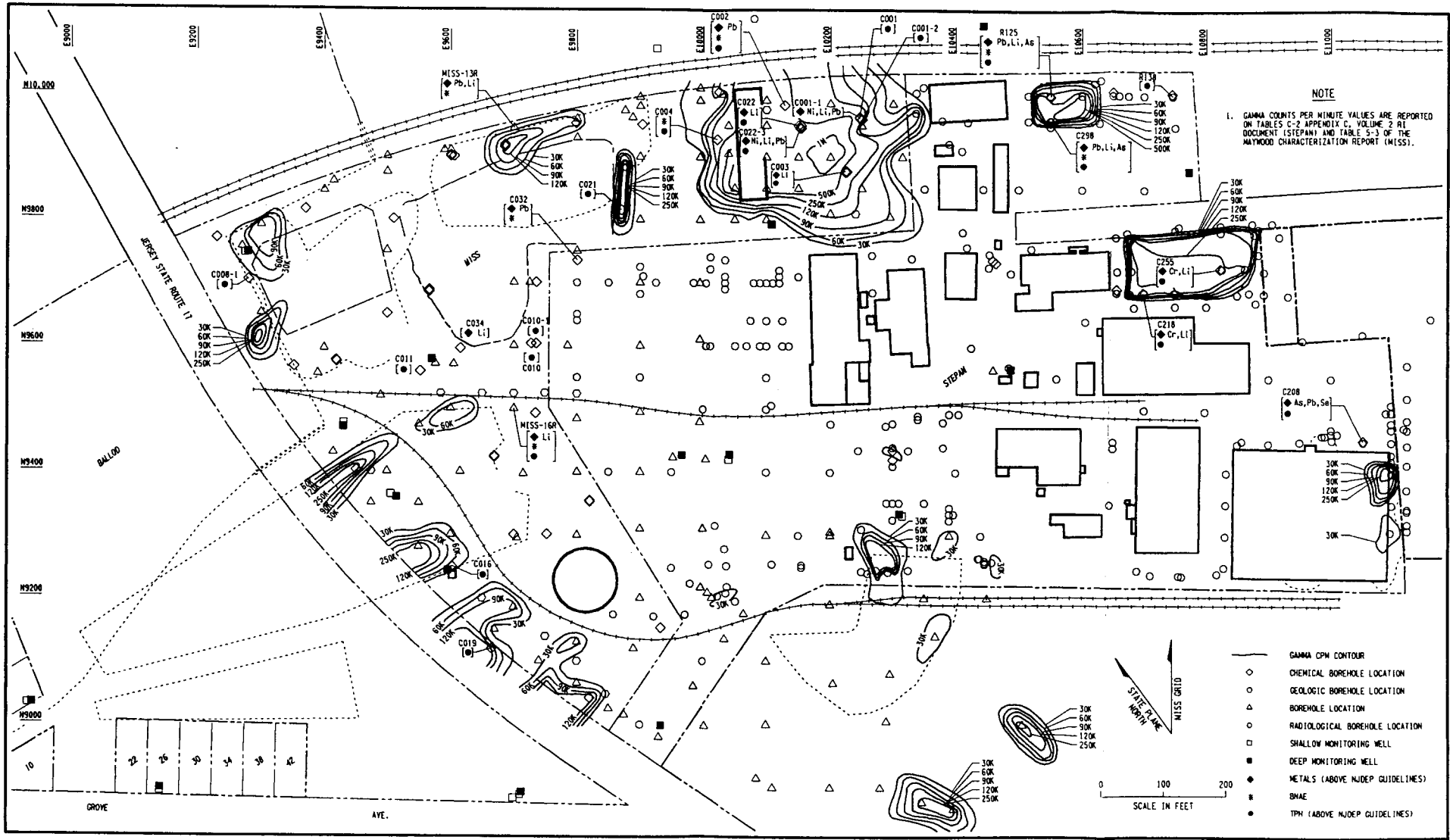


Figure 4-4
Summary Map of Contaminant Distribution, 2-3 ft



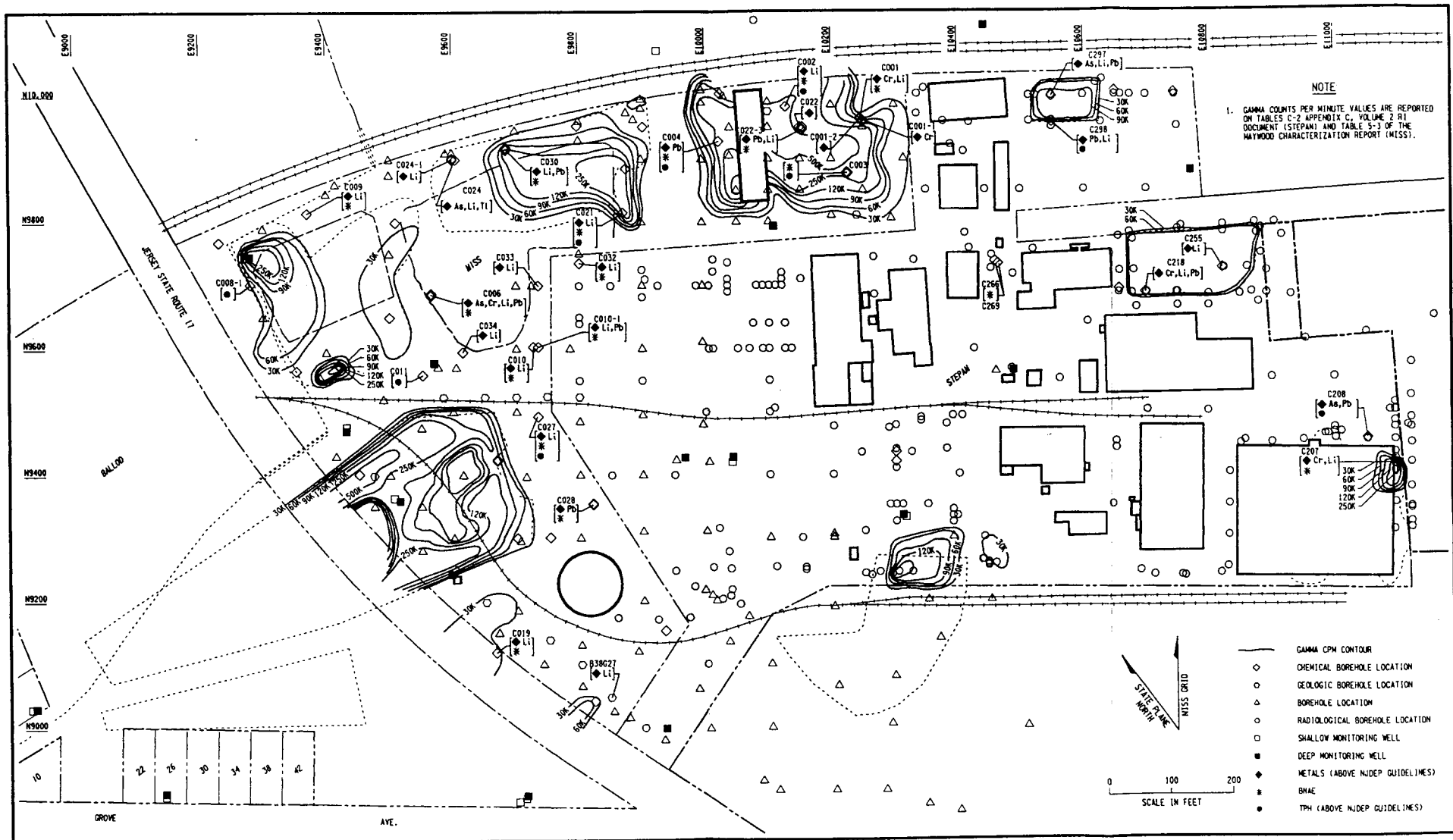
RD1F075B.DGN

Figure 4-5
Summary Map of Contaminant Distribution, 3-4 ft



R01F0788.DGN

Figure 4-6
Summary Map of Contaminant Distribution, 4-5 ft



RO1F077B.DGN

Figure 4-7
Summary Map of Contaminant Distribution, 5-10 ft

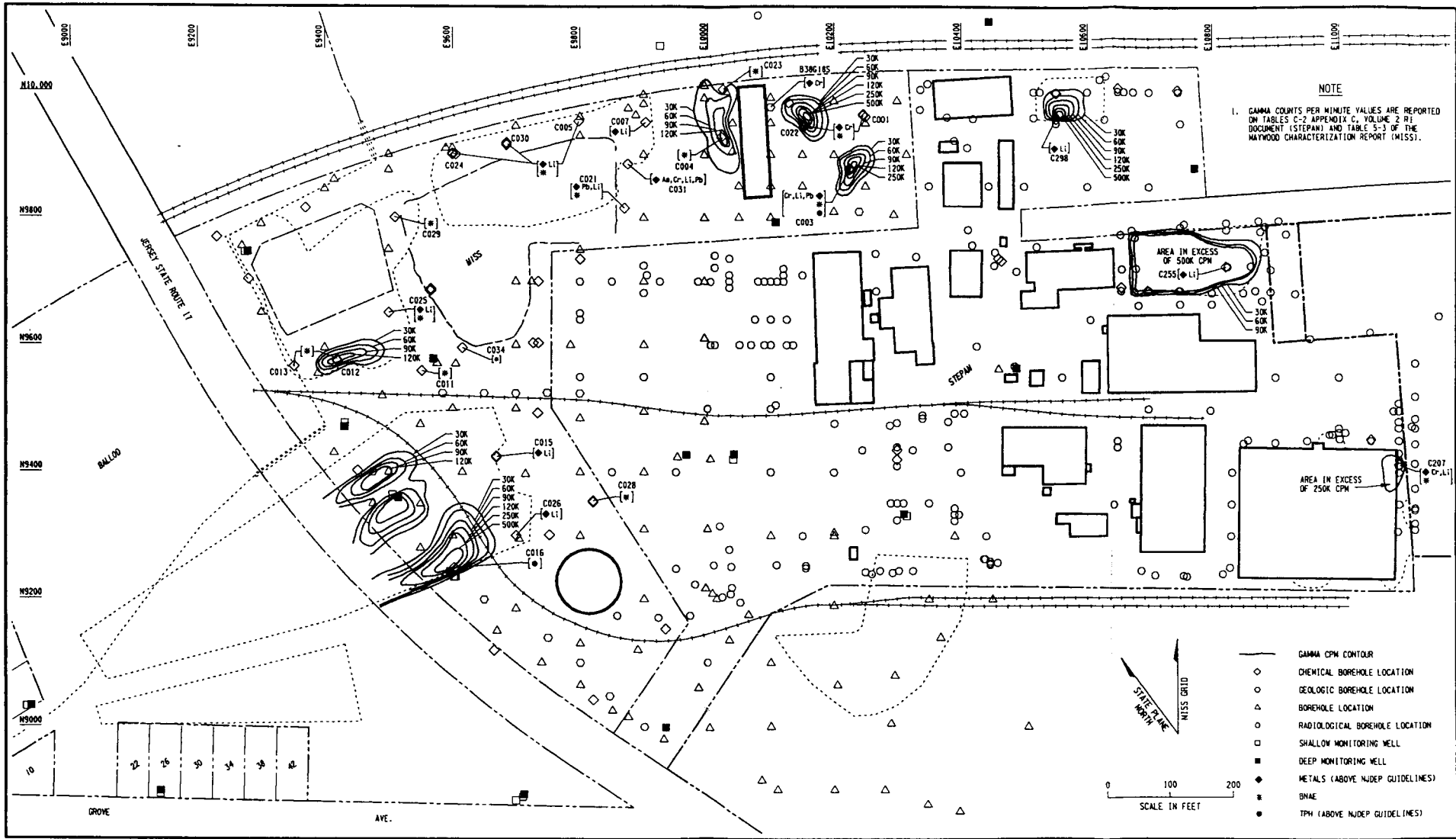
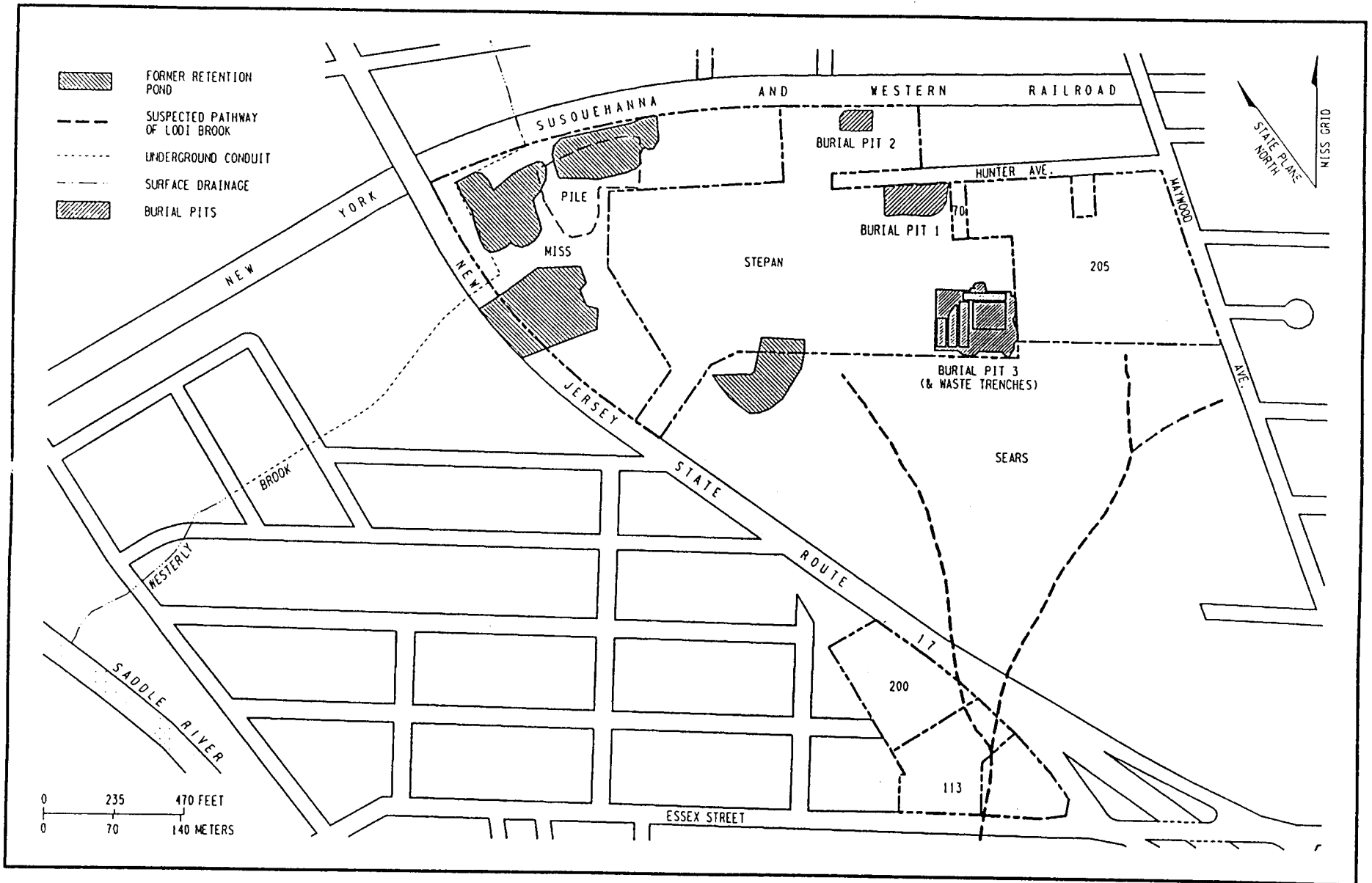


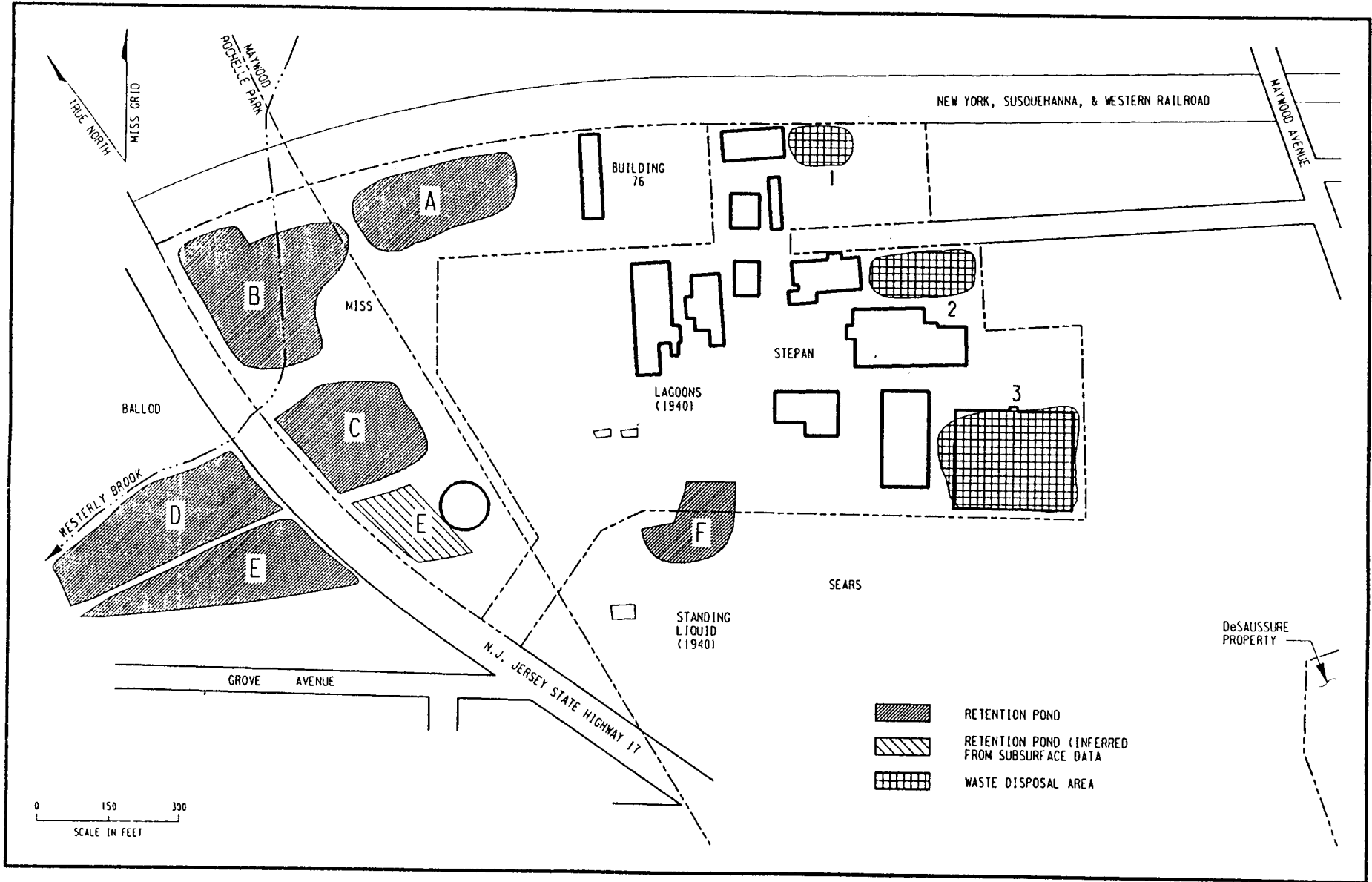
Figure 4-8
Summary Map of Contaminant Distribution, 10-15 ft

4-105



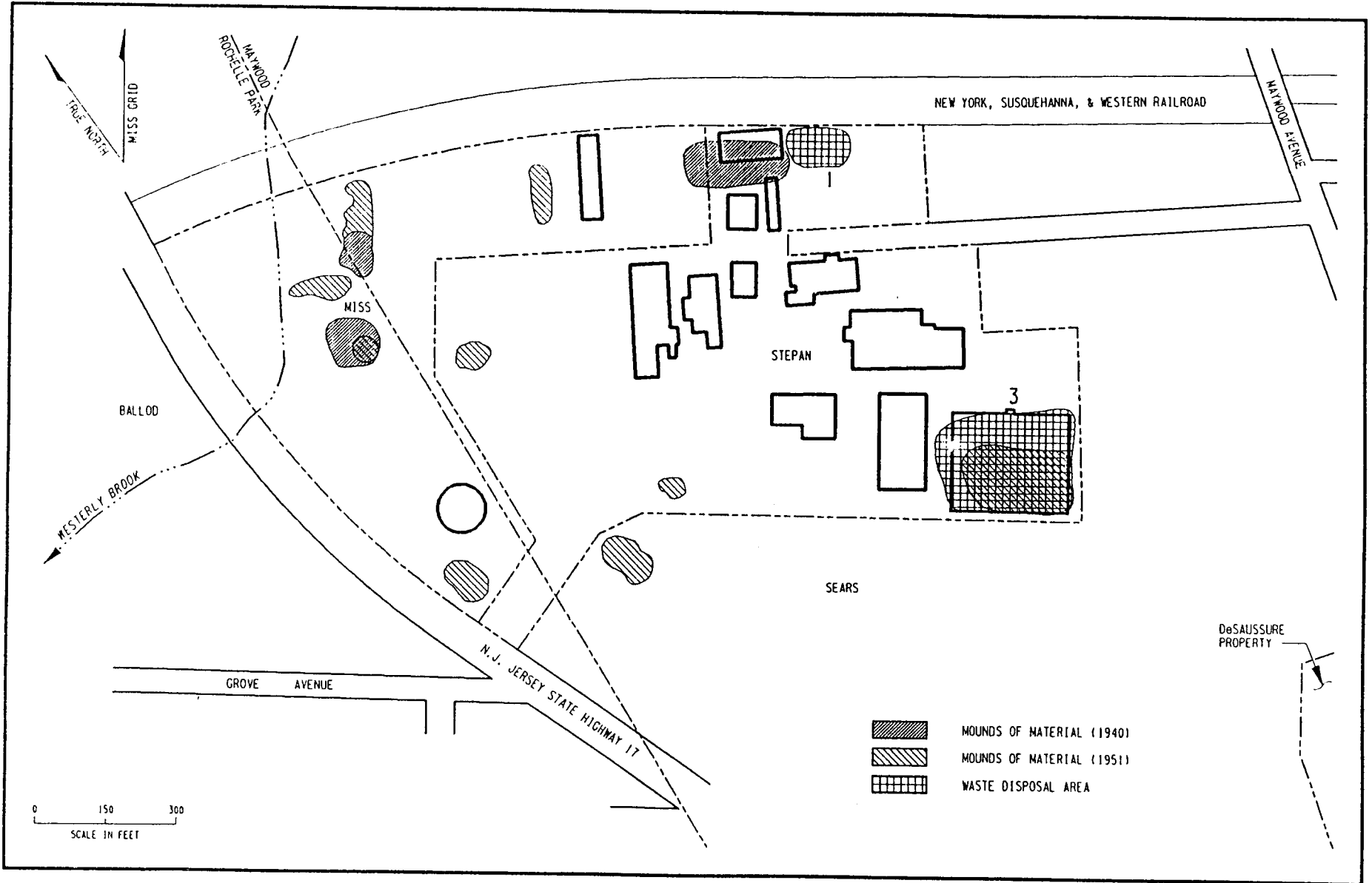
138 R01F021.DGN

Figure 4-9
Locations of Primary Sources of Contamination



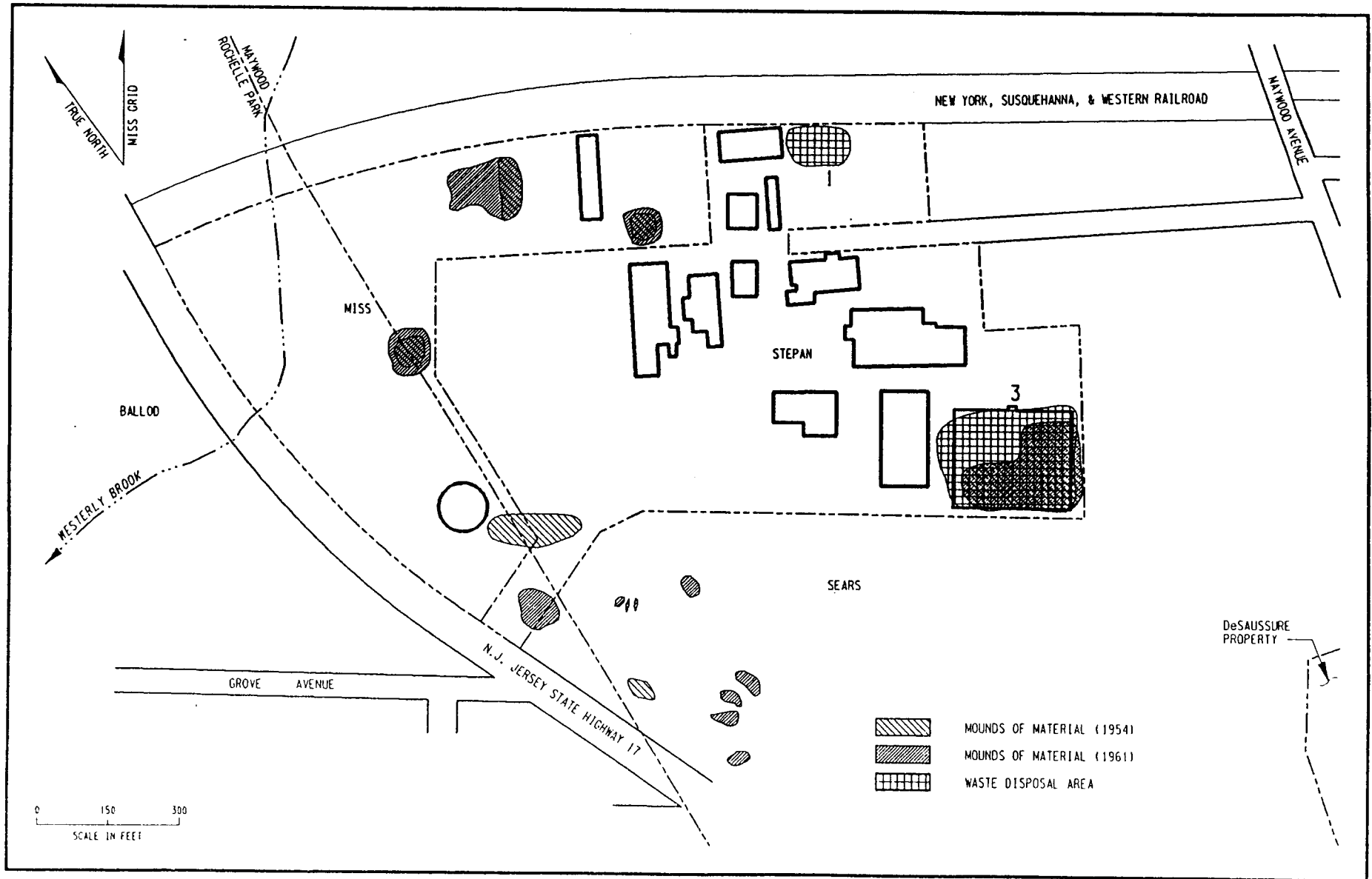
R01F063.DGN F1

Figure 4-10
Approximate Locations of Retention Ponds (1940-1983)



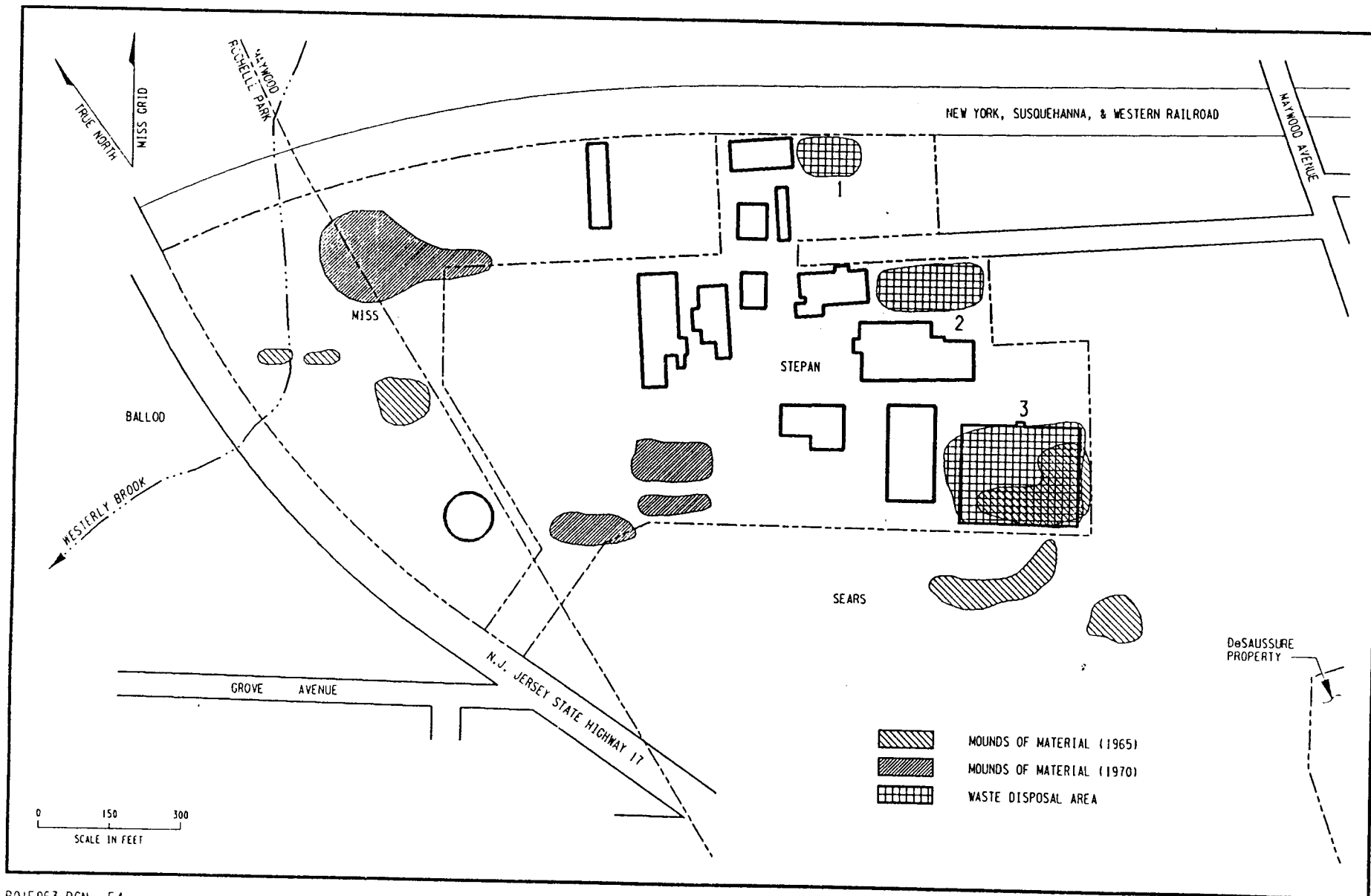
R01F063.DGN F2

Figure 4-11
Approximate Locations of Mounds of Material (1940-1951)



R01F053.DGN F 3

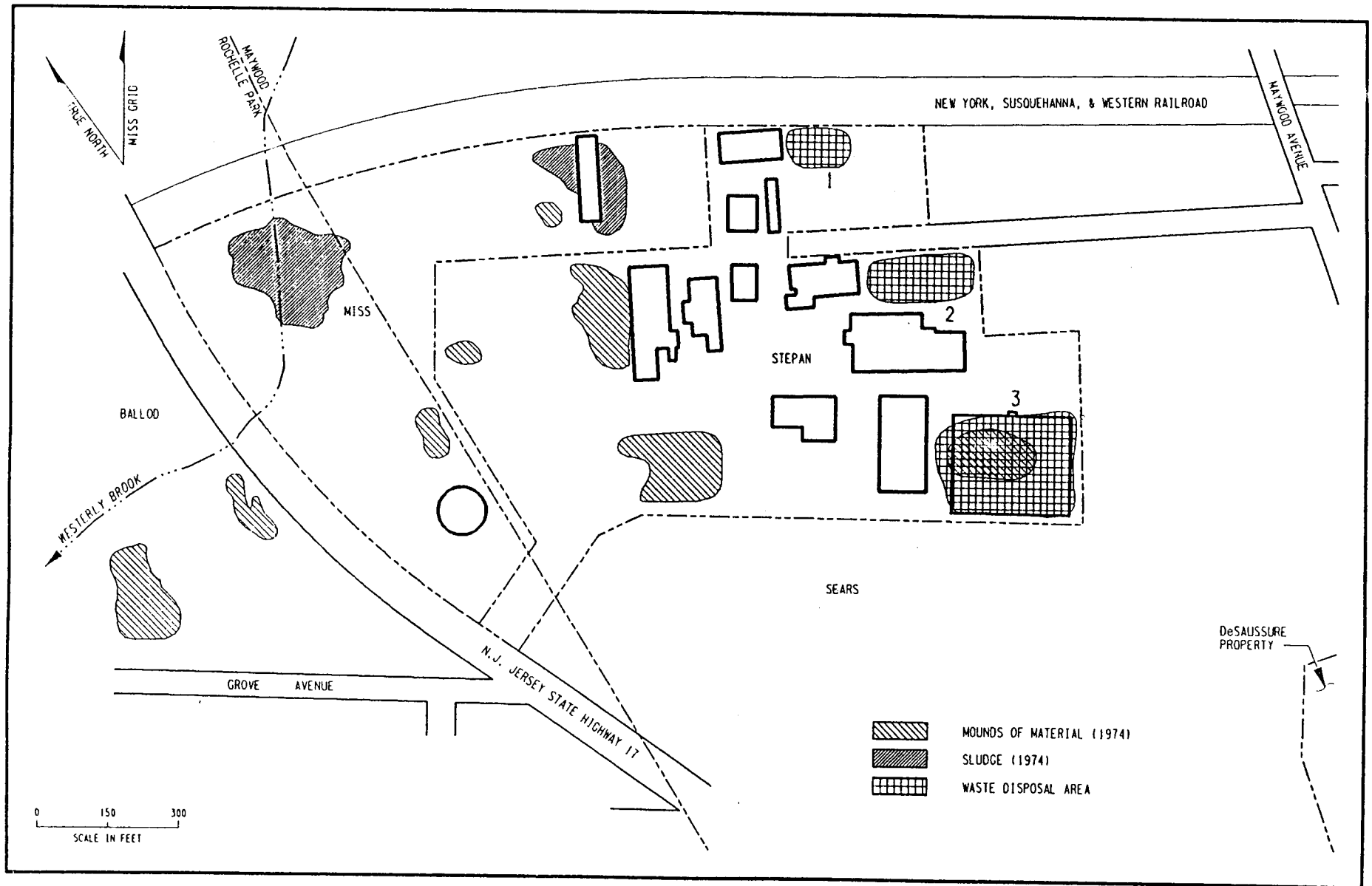
Figure 4-12
Approximate Locations of Mounds of Material (1954-1961)



R01F063.DGN F 4

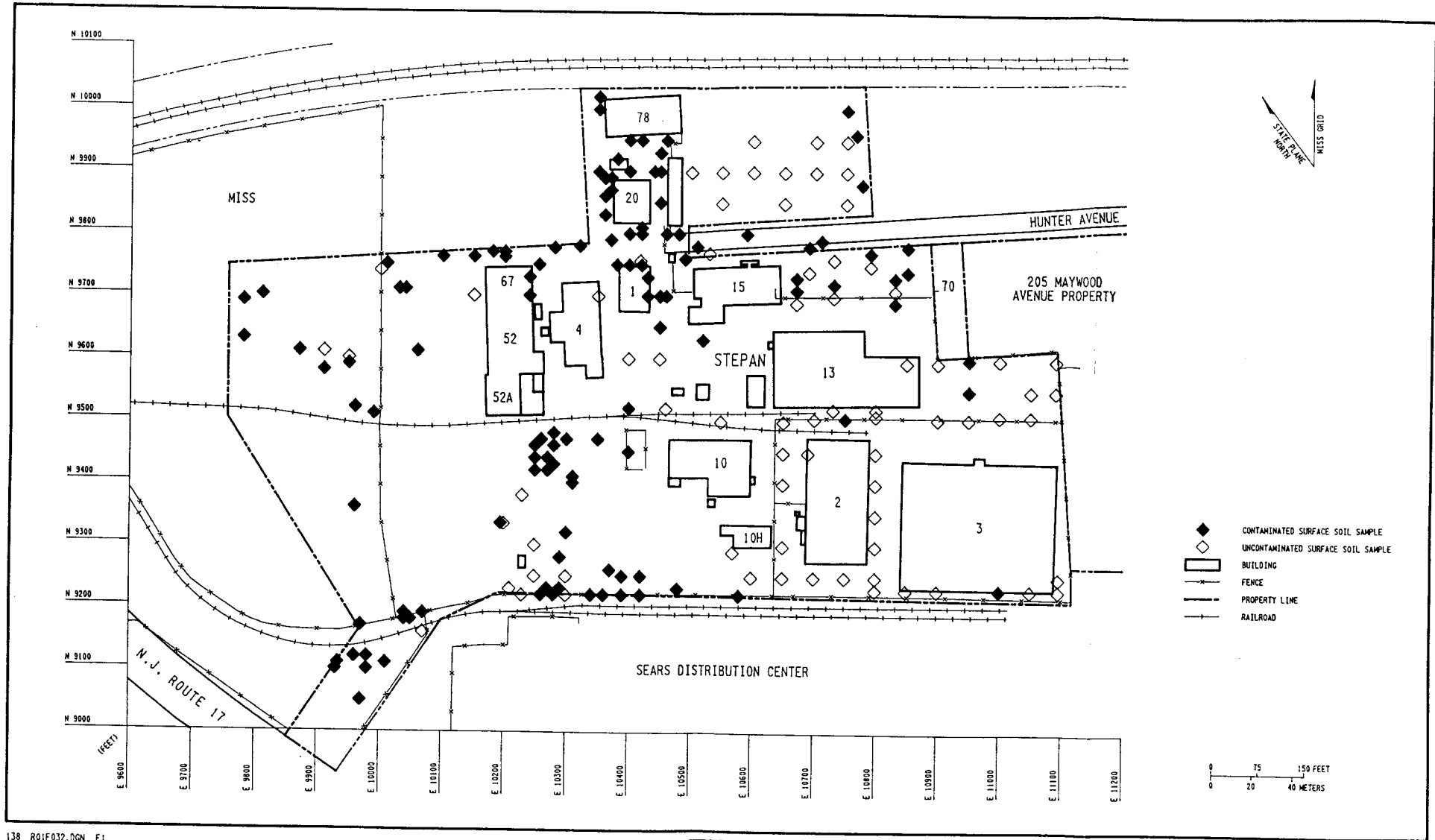
Figure 4-13
Approximate Locations of Mounds of Material (1965-1970)

4-110



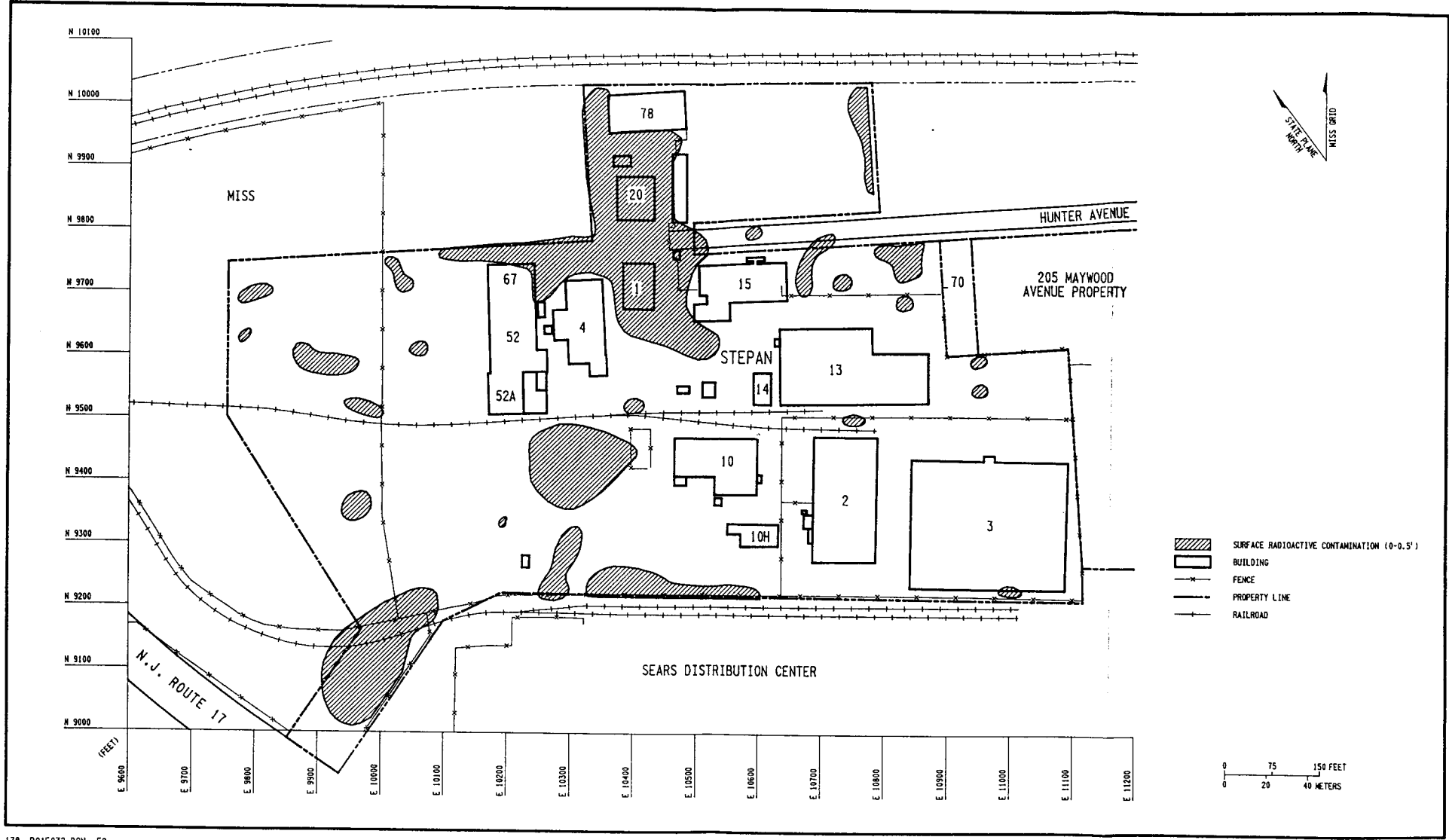
ROIF063.DGN F5

Figure 4-14
Approximate Locations of Mounds of Material and Sludge (1974)



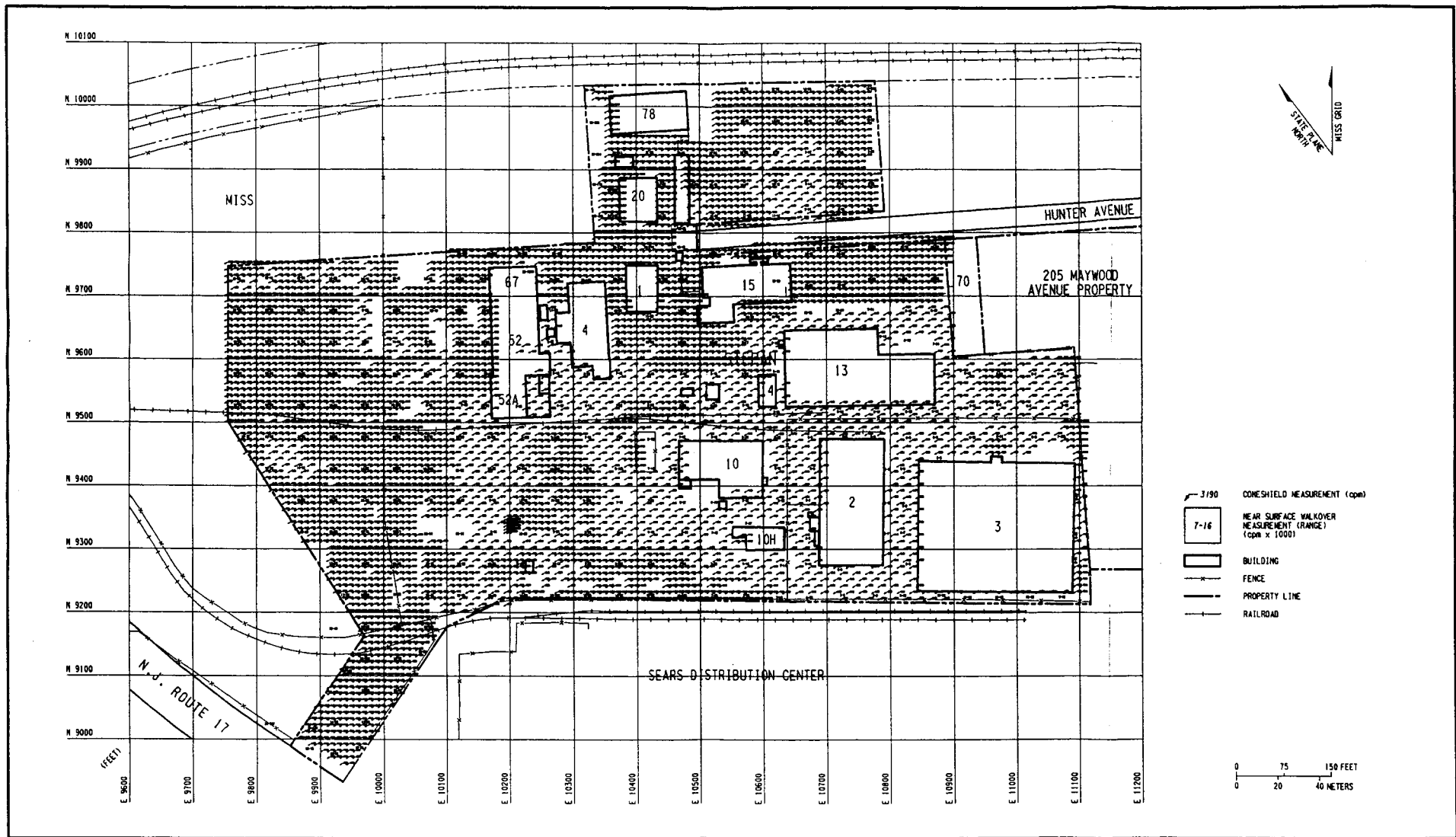
138 R01F032.DGN F1

Figure 4-15
Stepan Property Surface Soil Sampling Locations



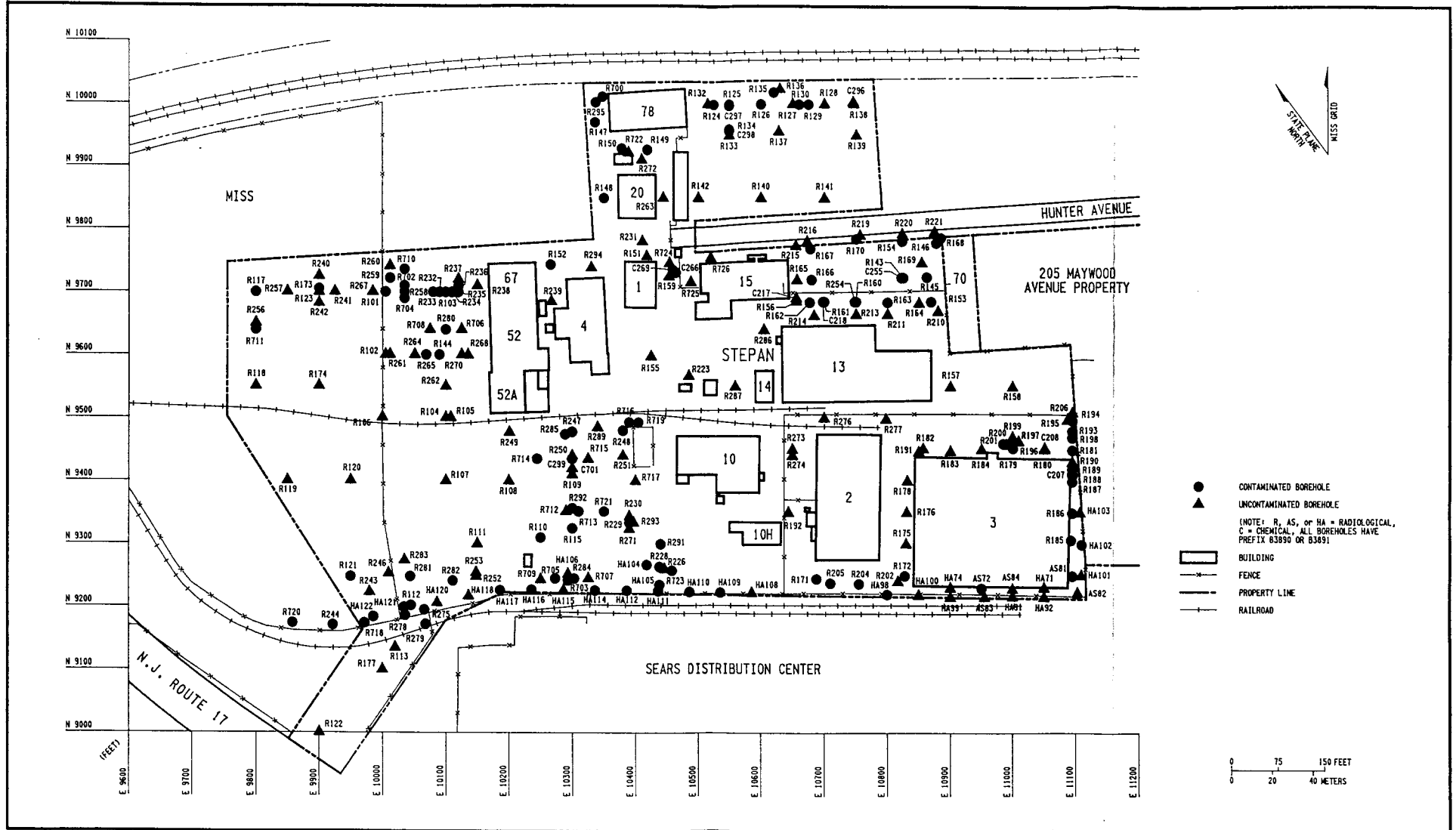
138 R01F032.DGN F2

Figure 4-16
Stepan Property Areas of Surface Radioactive Contamination



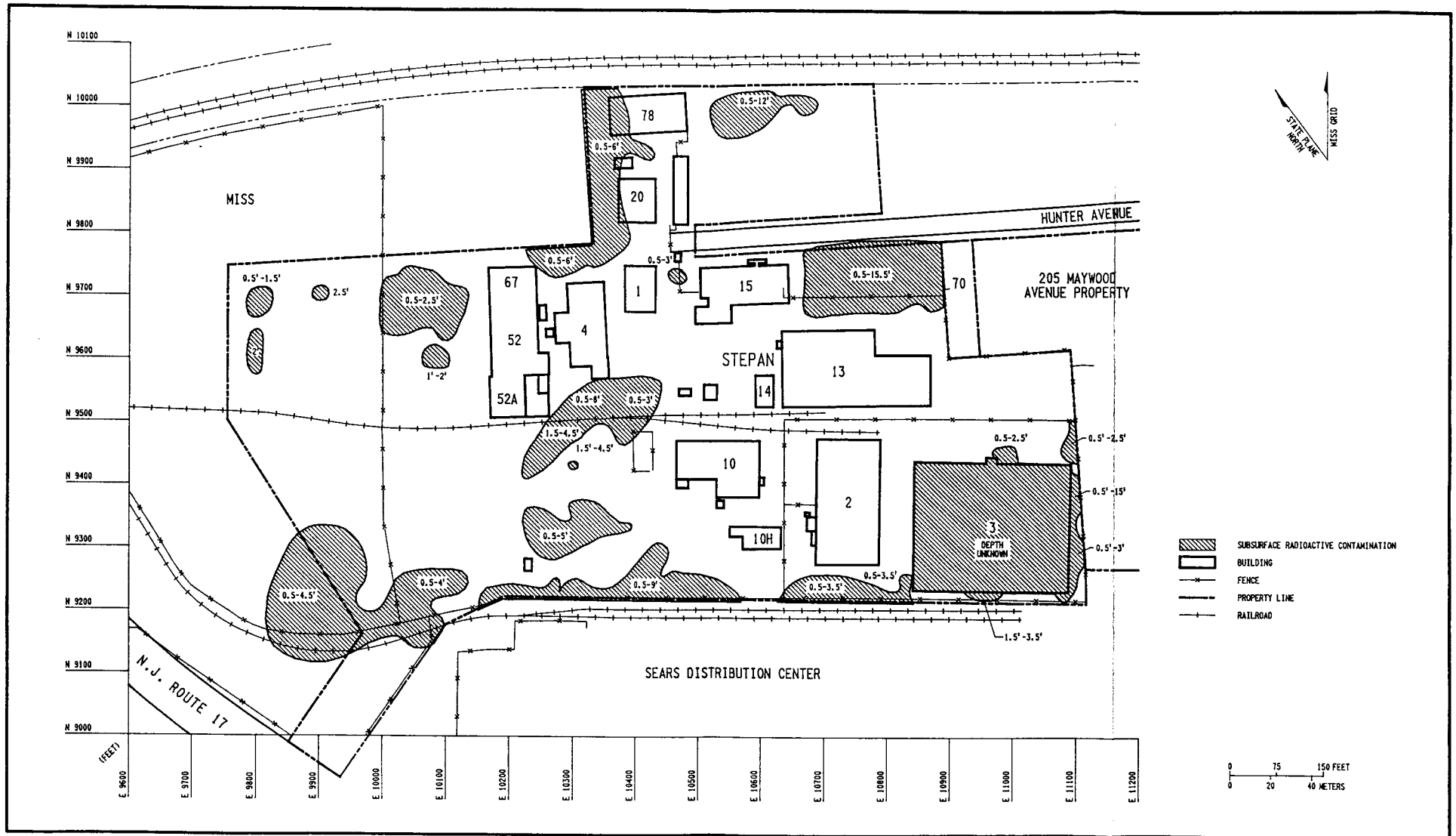
138 ROIF032.DGN F7

Figure 4-16a
Surface Gamma and Coneshield Walkover Measurements at the Stepan Property



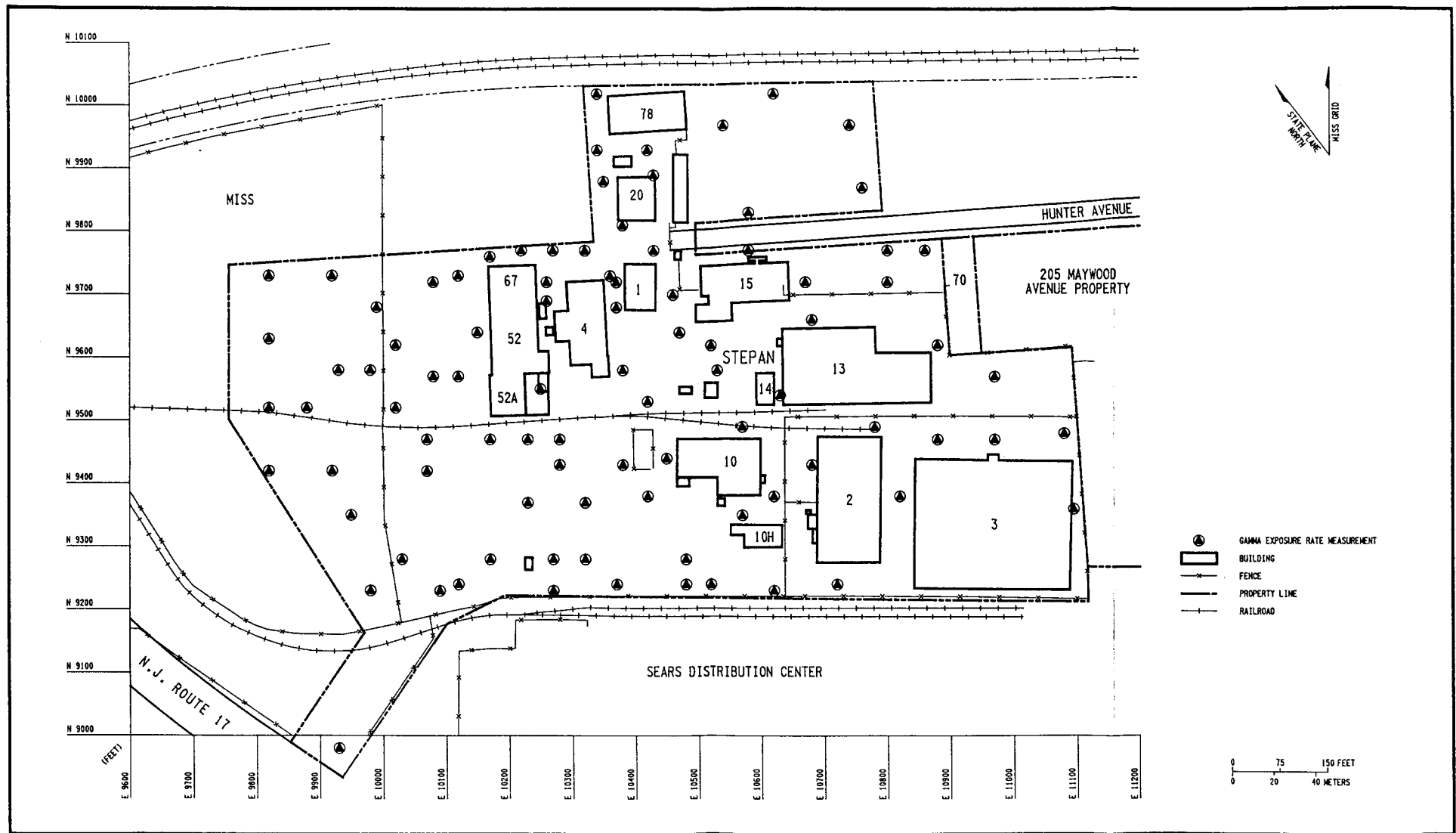
138 ROIF032.0GN F3

Figure 4-17
Stepan Property Borehole Locations



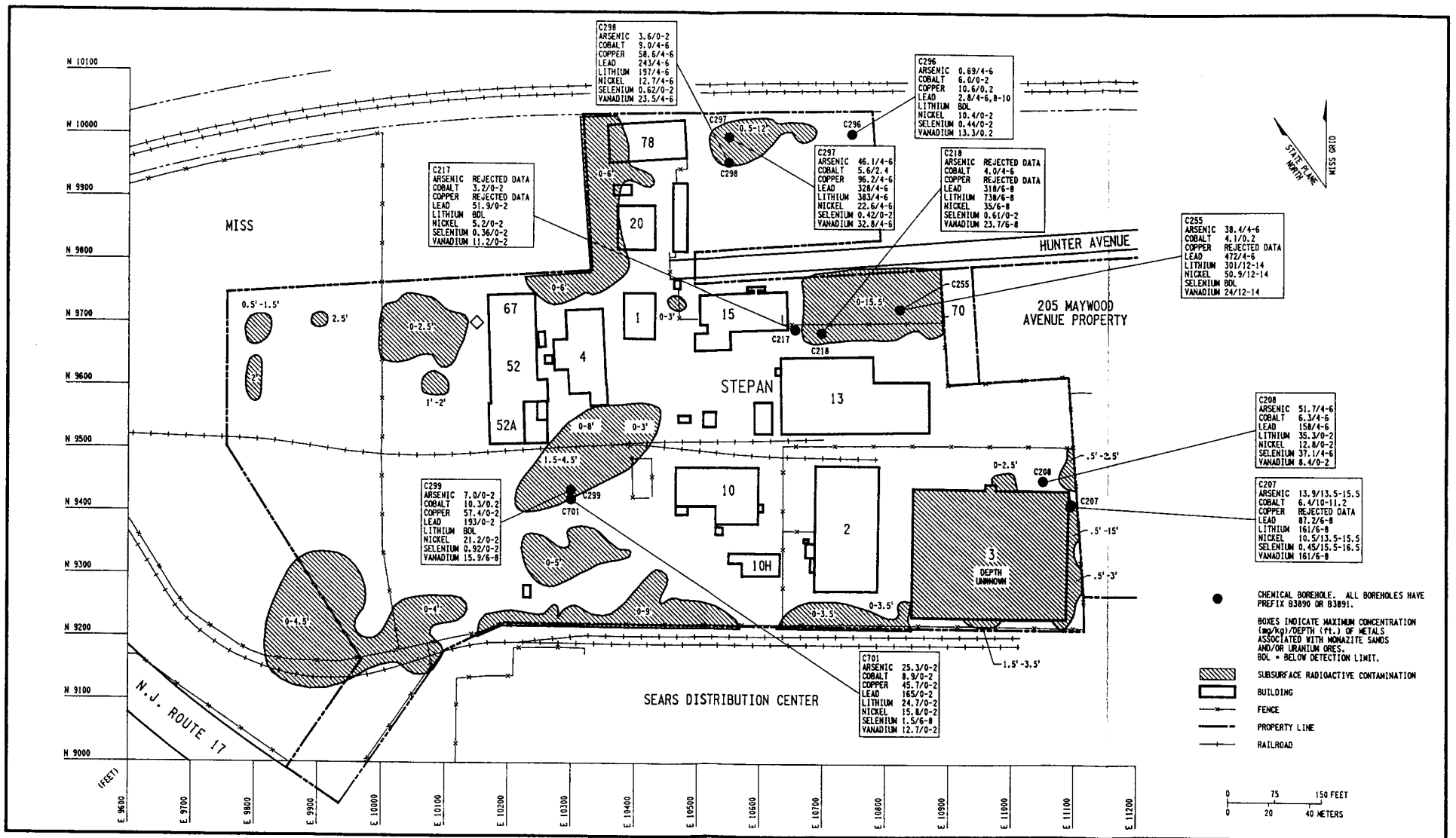
138 R01F032.DGN F4

Figure 4-18
 Stepan Property Subsurface Radioactive Contamination



138 R01F032.DGN F5

Figure 4-19
Stepan Property Locations of Gamma Exposure Rate Measurements



138 RO1F046.DGN

Figure 4-20
Stepan Property Locations of Chemical Boreholes
and Areas of Subsurface Contamination

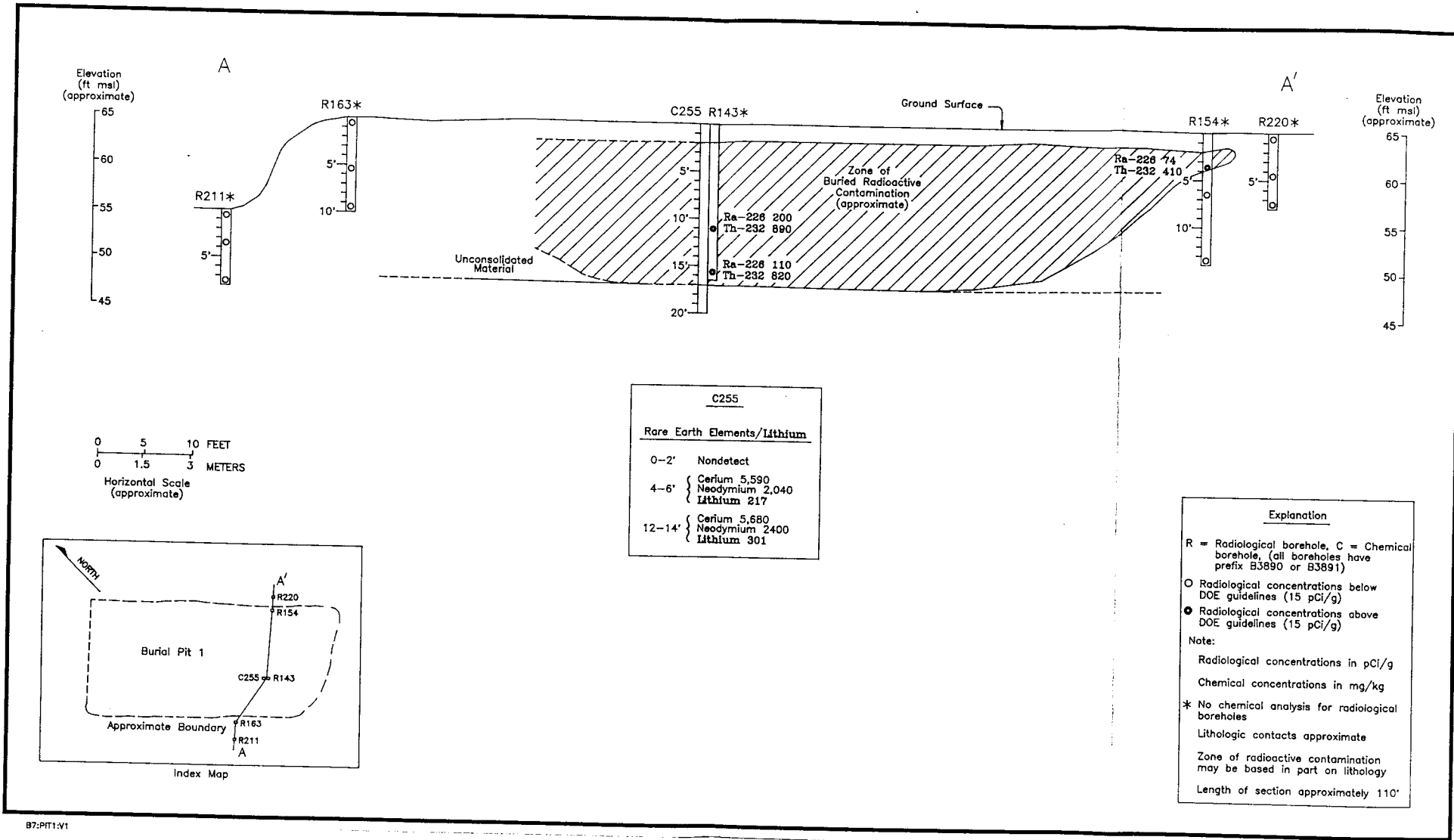


Figure 4-21
Stepan Burial Pit 1, Cross Section A-A'

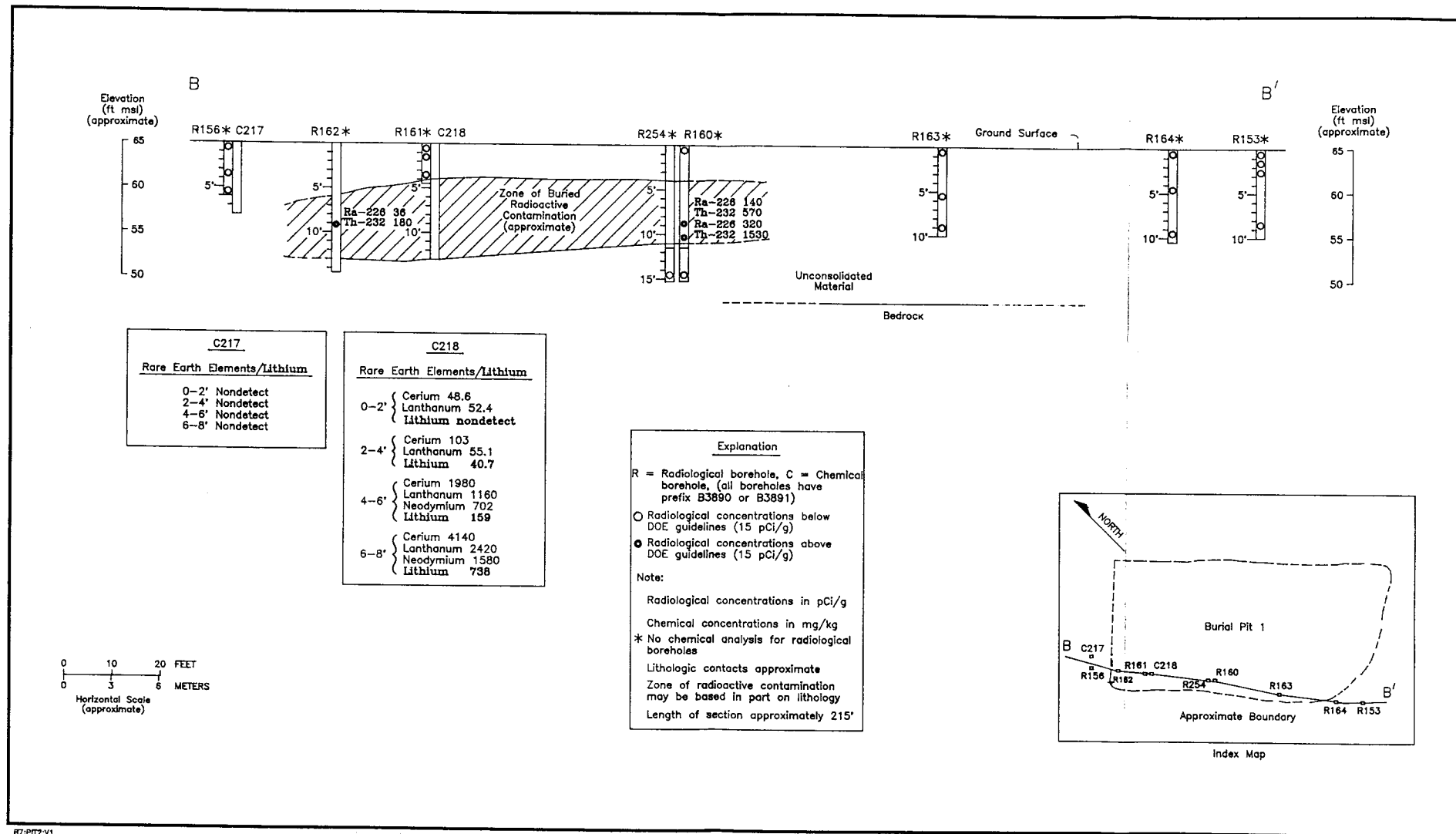


Figure 4-22
Stepan Burial Pit 1, Cross Section B-B'

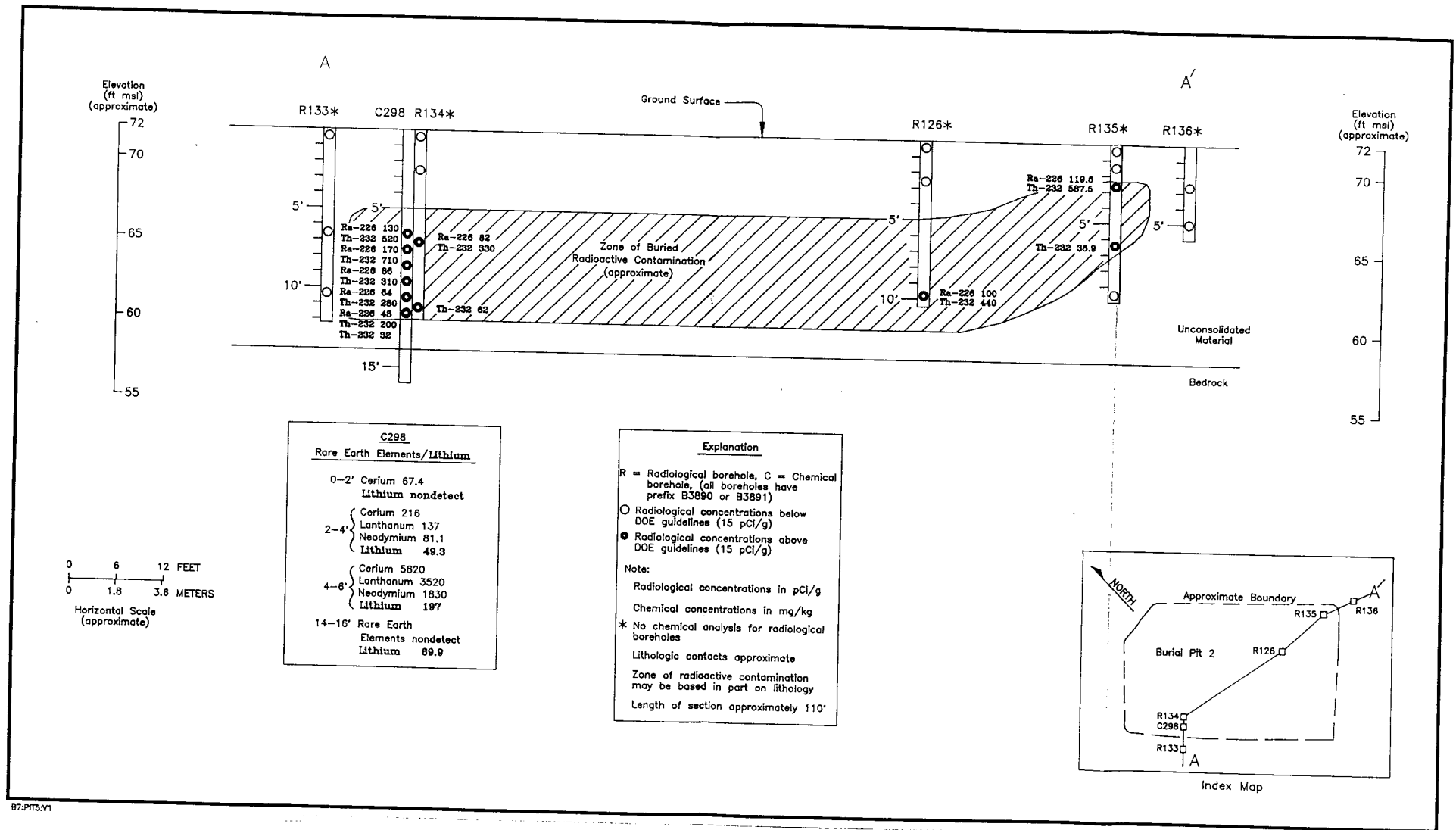
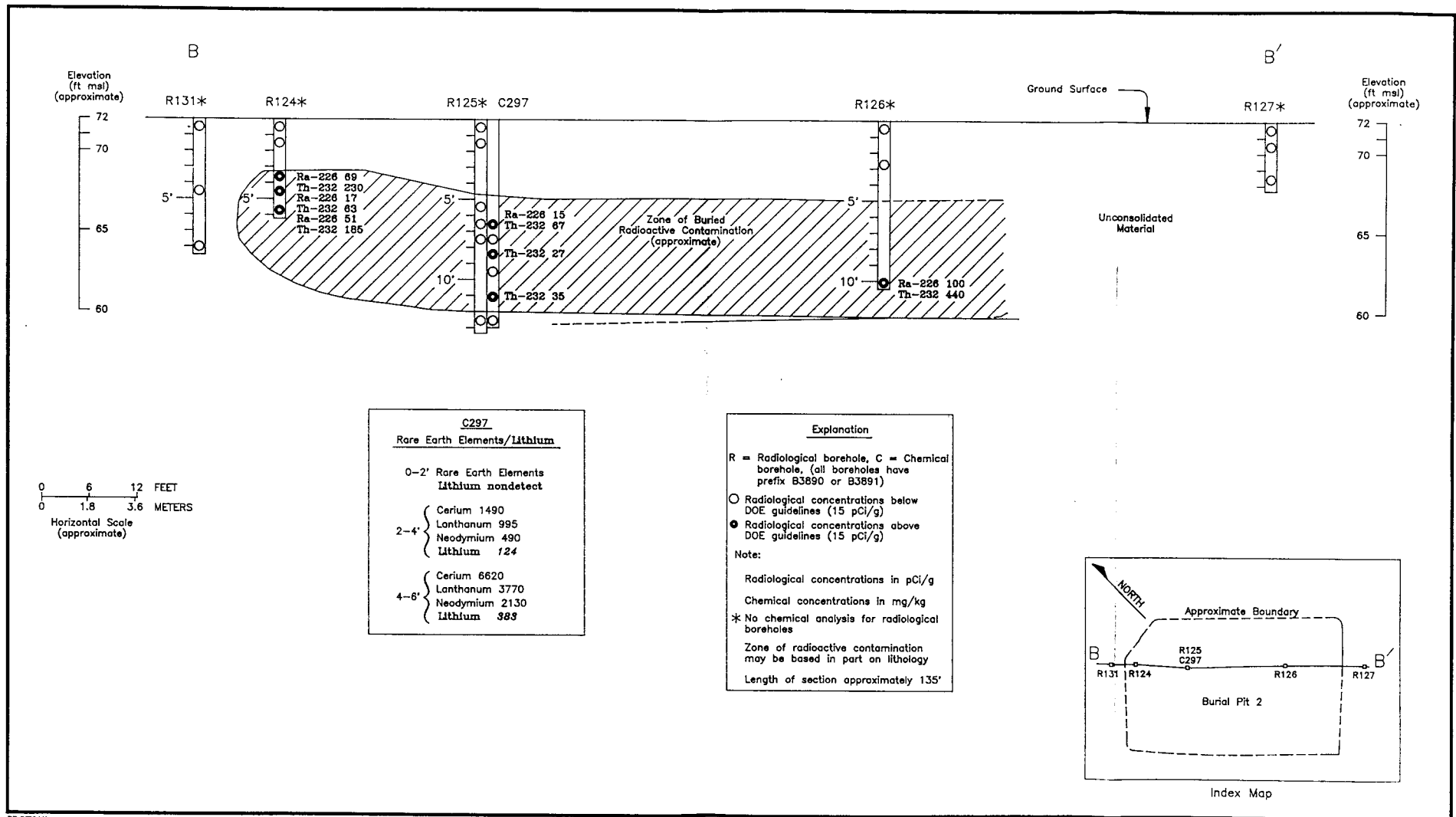


Figure 4-23
Stepan Burial Pit 2, Cross Section A-A'



B7:PIT&V1

Figure 4-24
Stepan Burial Pit 2, Cross Section B-B'

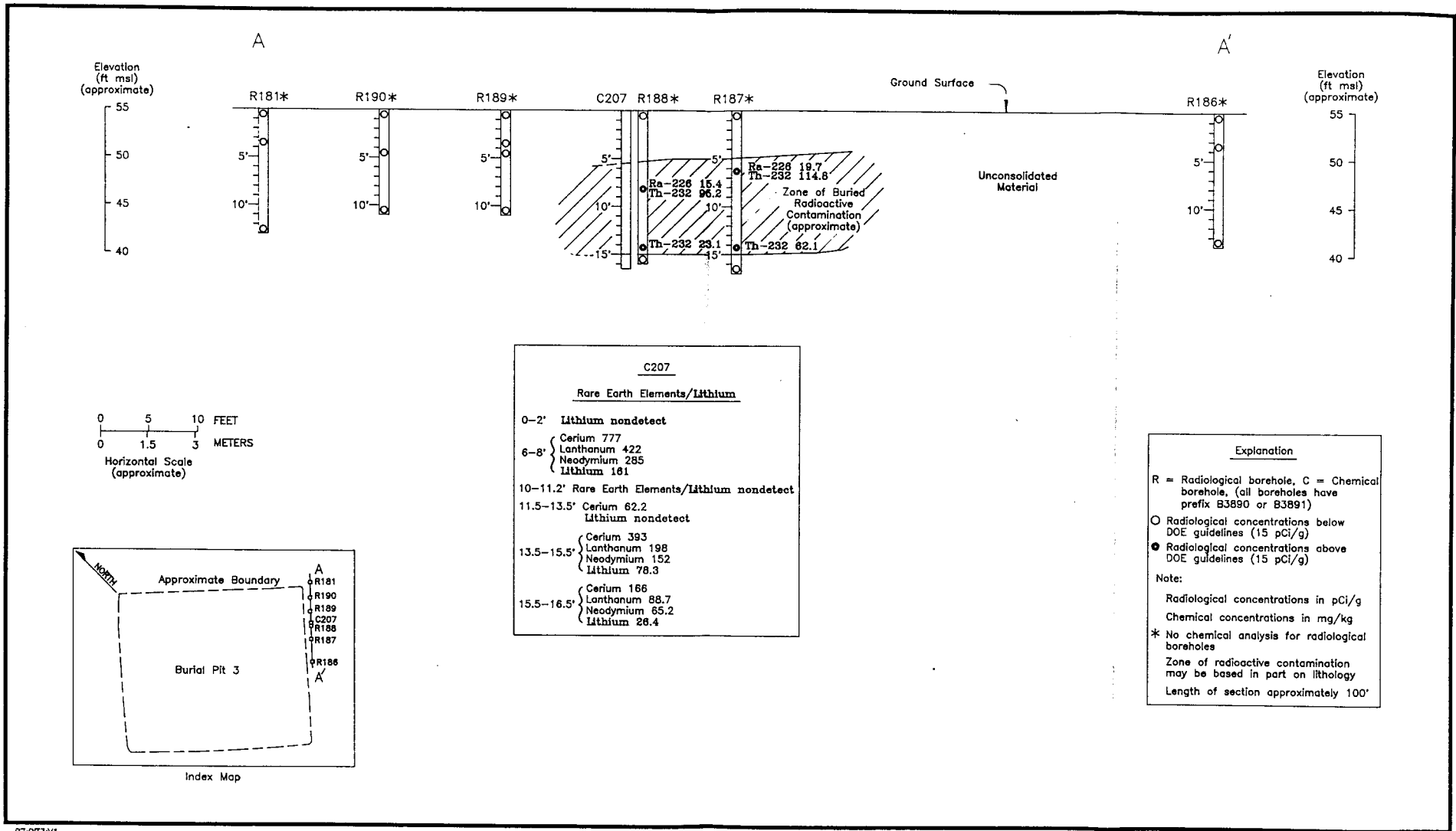


Figure 4-25
Stepan Burial Pit 3, Cross Section A-A'

4-135

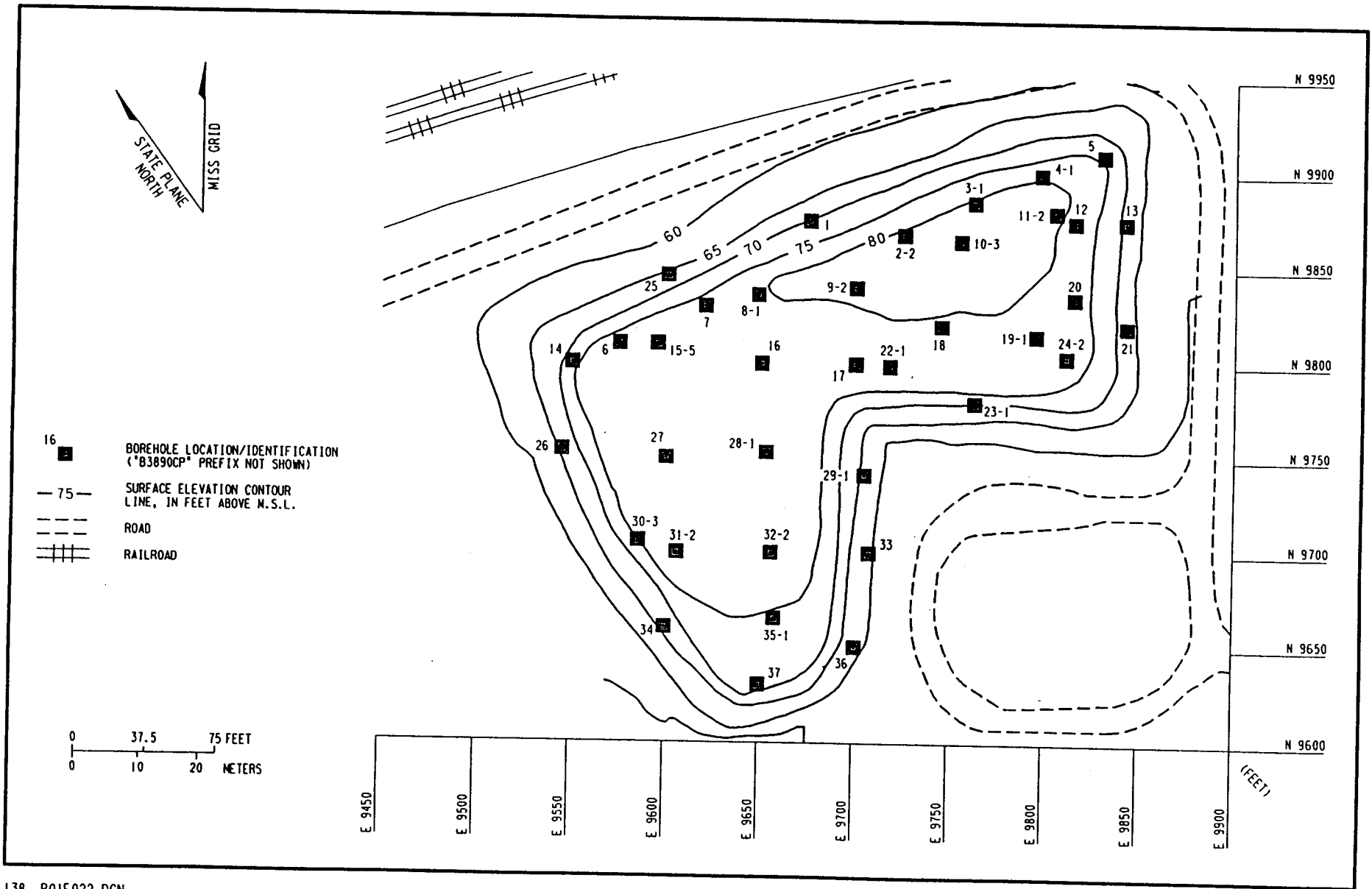
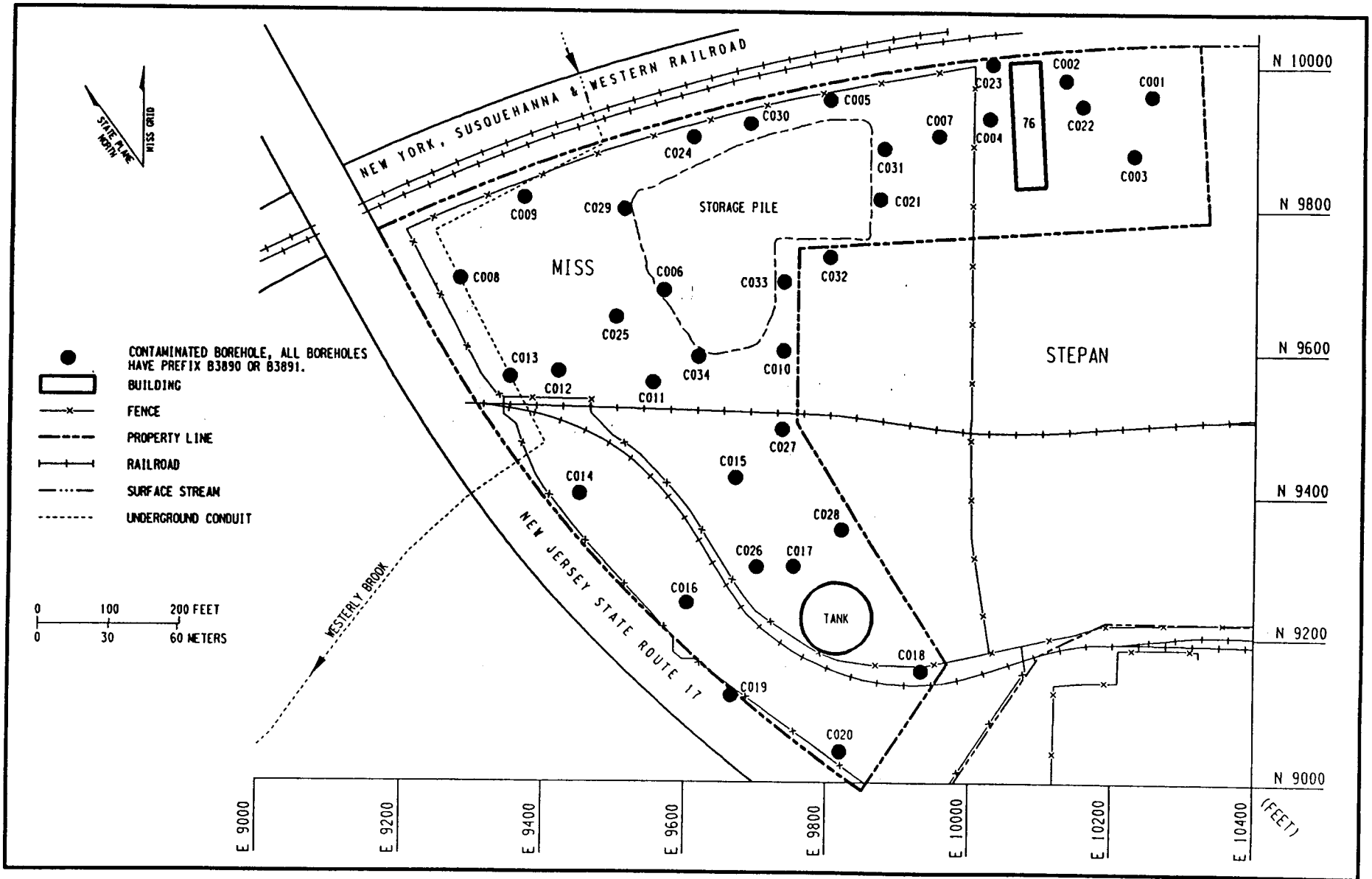


Figure 4-26
Storage Pile Borehole Locations at MISS

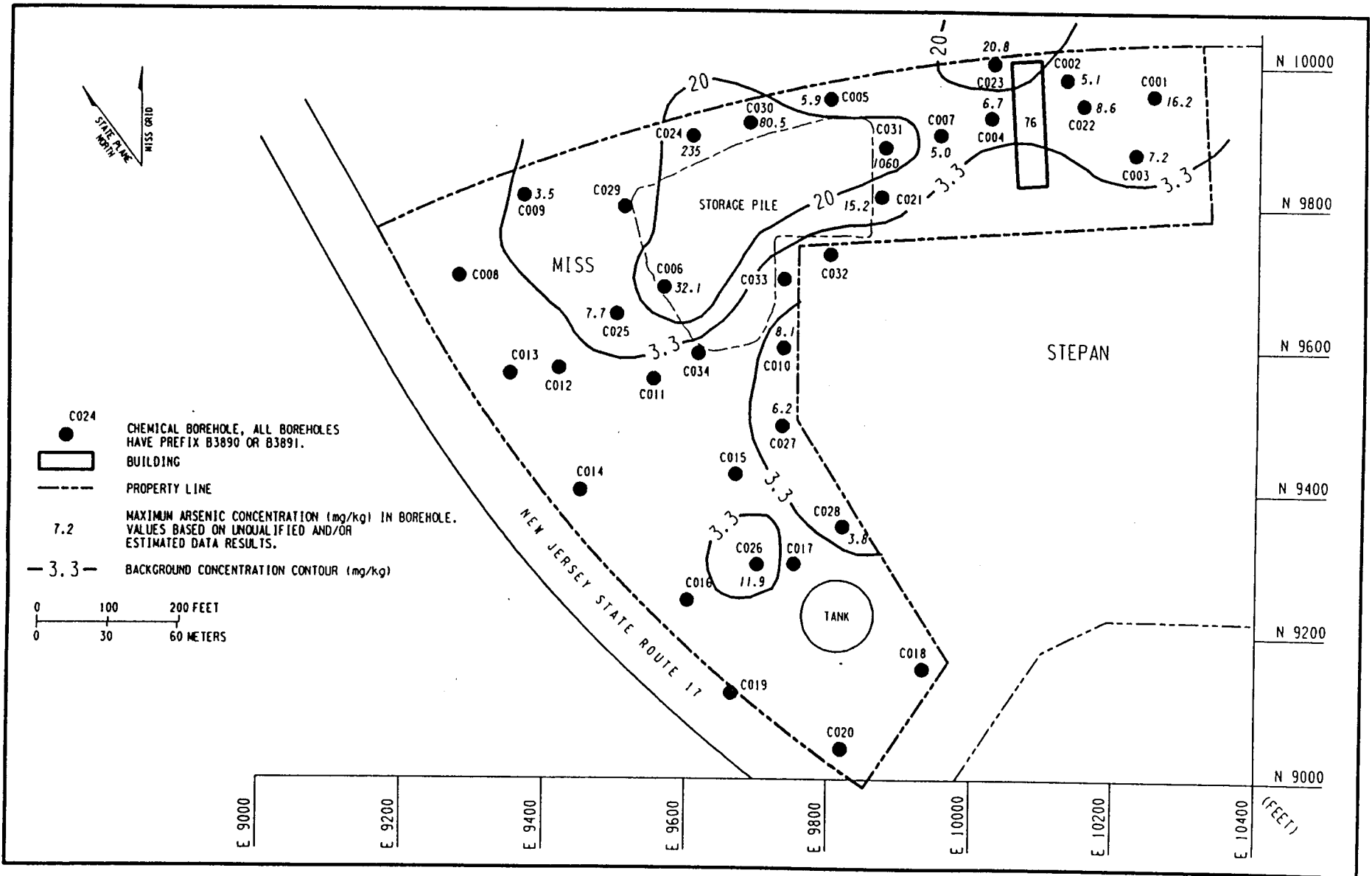
4-136



138 R01F003.DGN F1

Figure 4-27
MISS Onsite Chemical Borehole Locations

4-137



138 R01F023.DGN F3

Figure 4-28
Total Arsenic in Soil at MISS

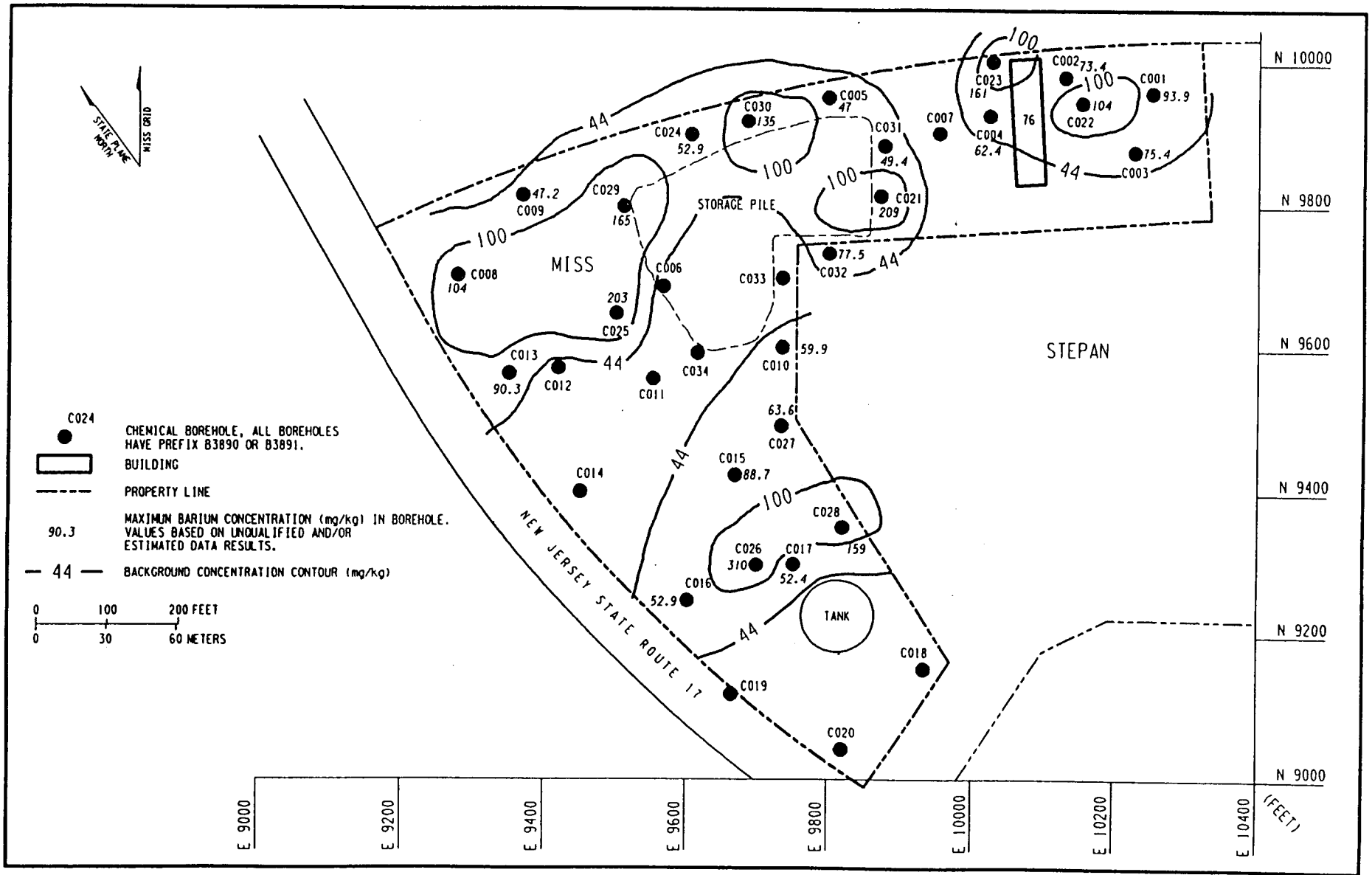
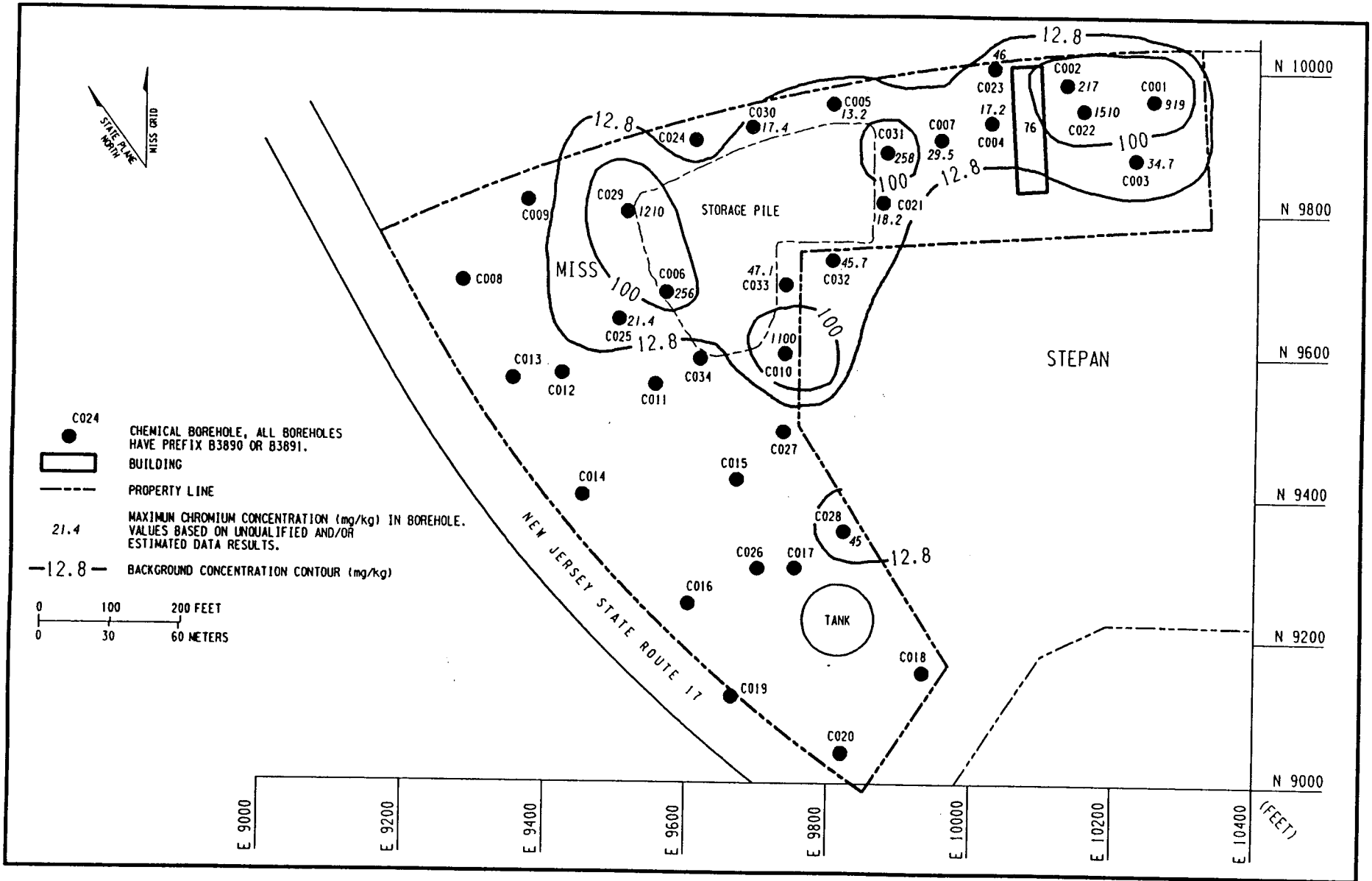


Figure 4-29
Total Barium in Soil at MISS

4-139



138 R01F023.DGN F4

Figure 4-30
Total Chromium in Soil at MISS

4-140

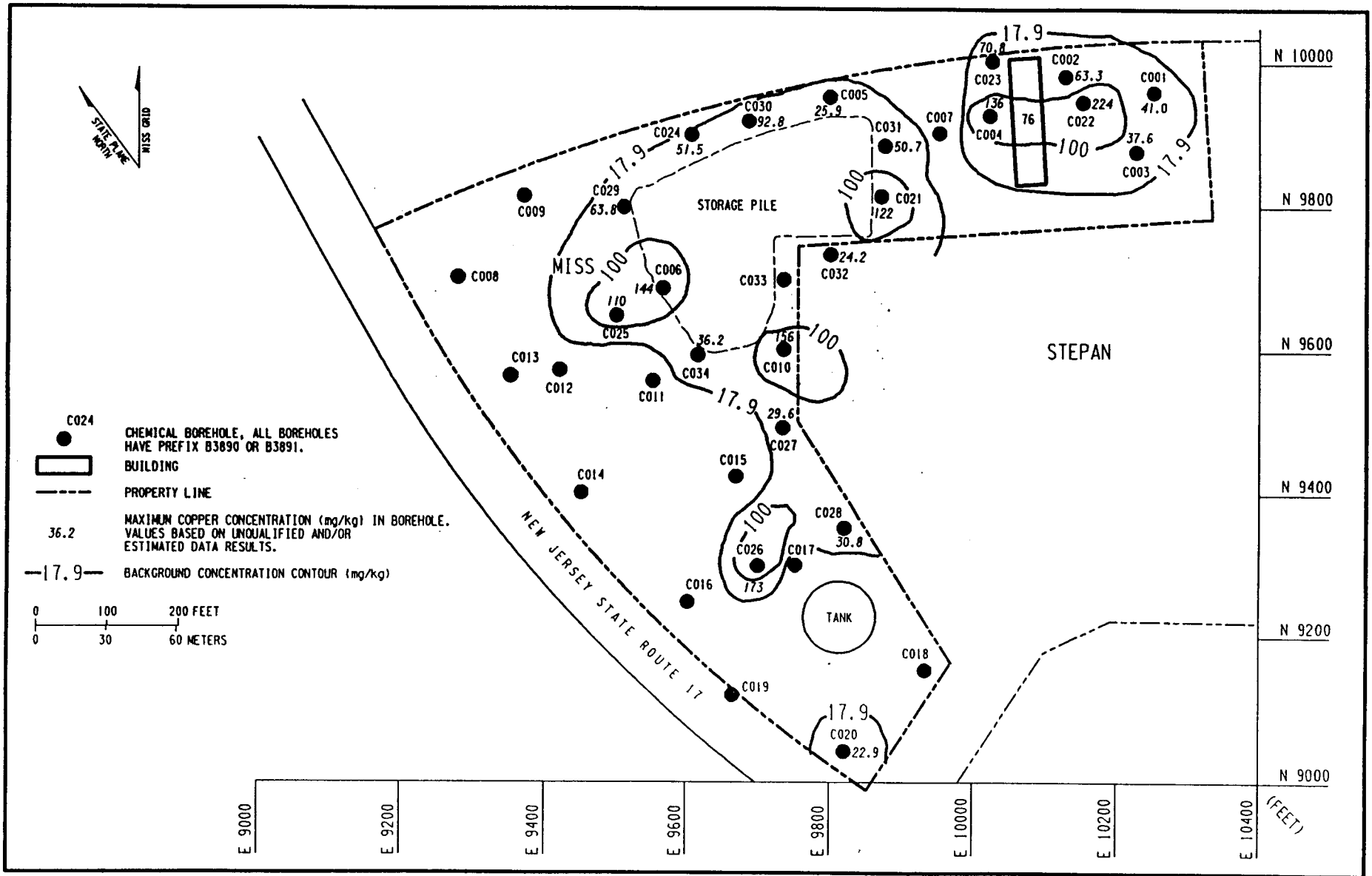


Figure 4-31
Total Copper in Soil at MISS

4-141

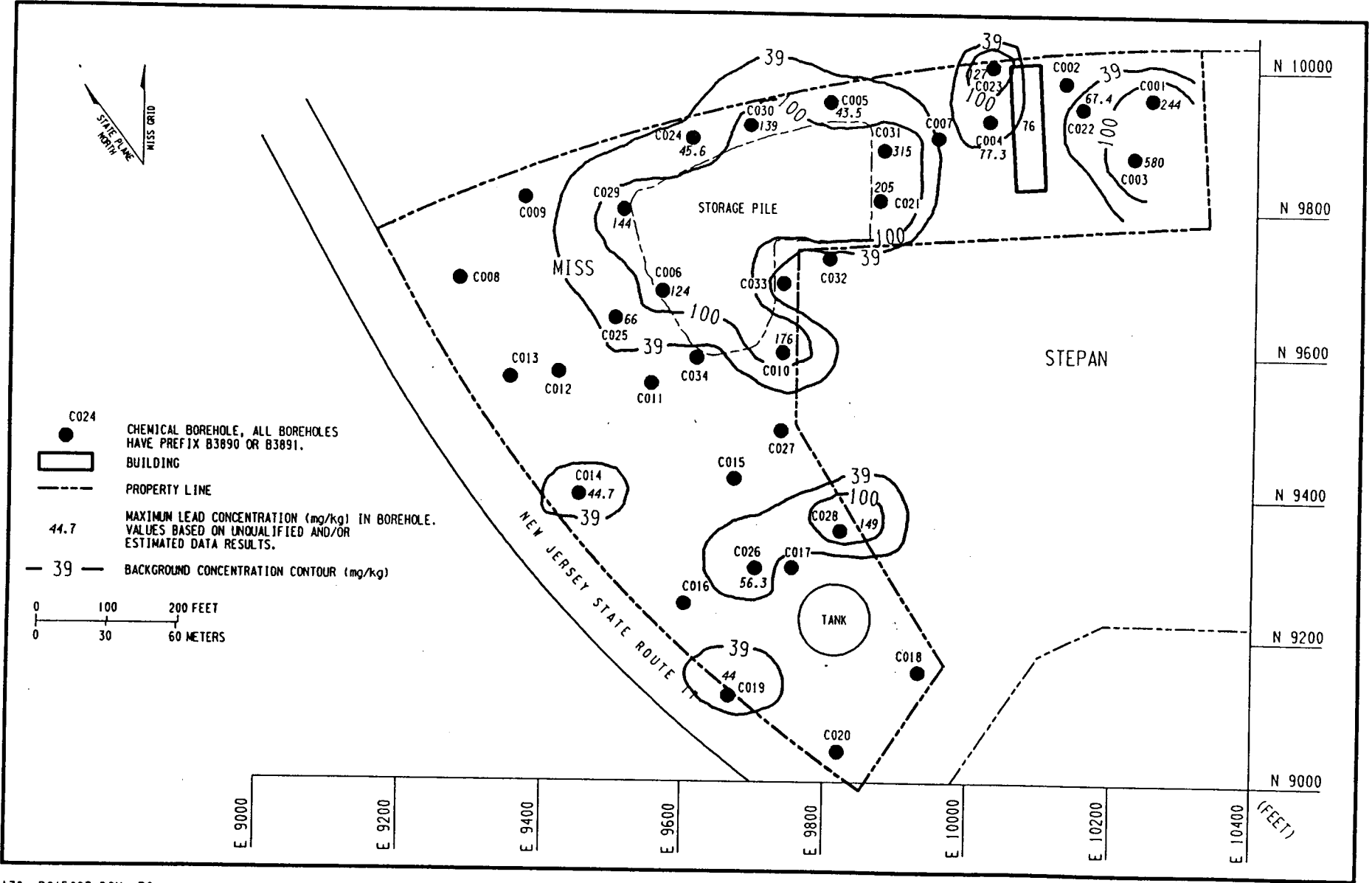
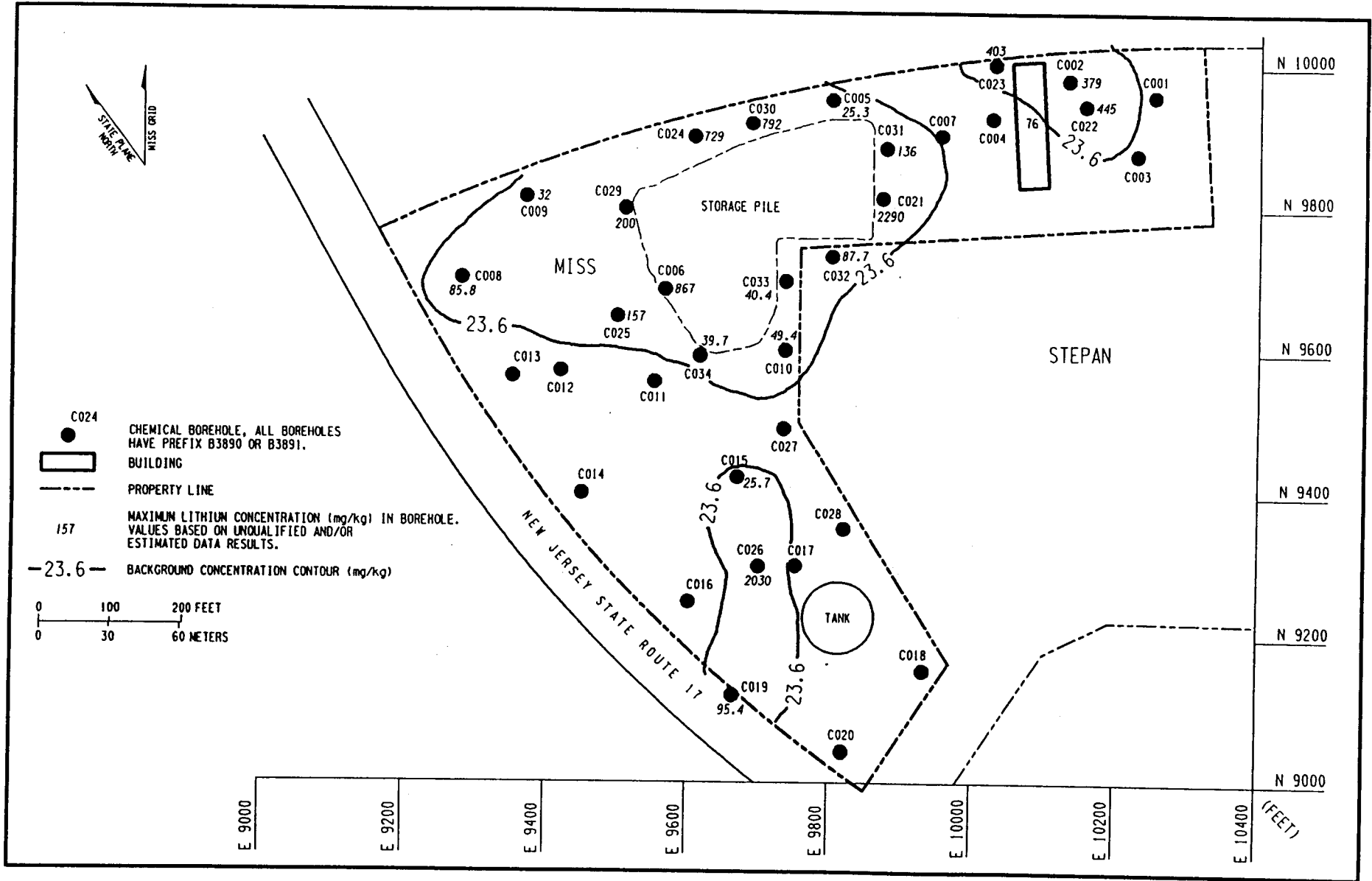


Figure 4-32
Total Lead in Soil at MISS

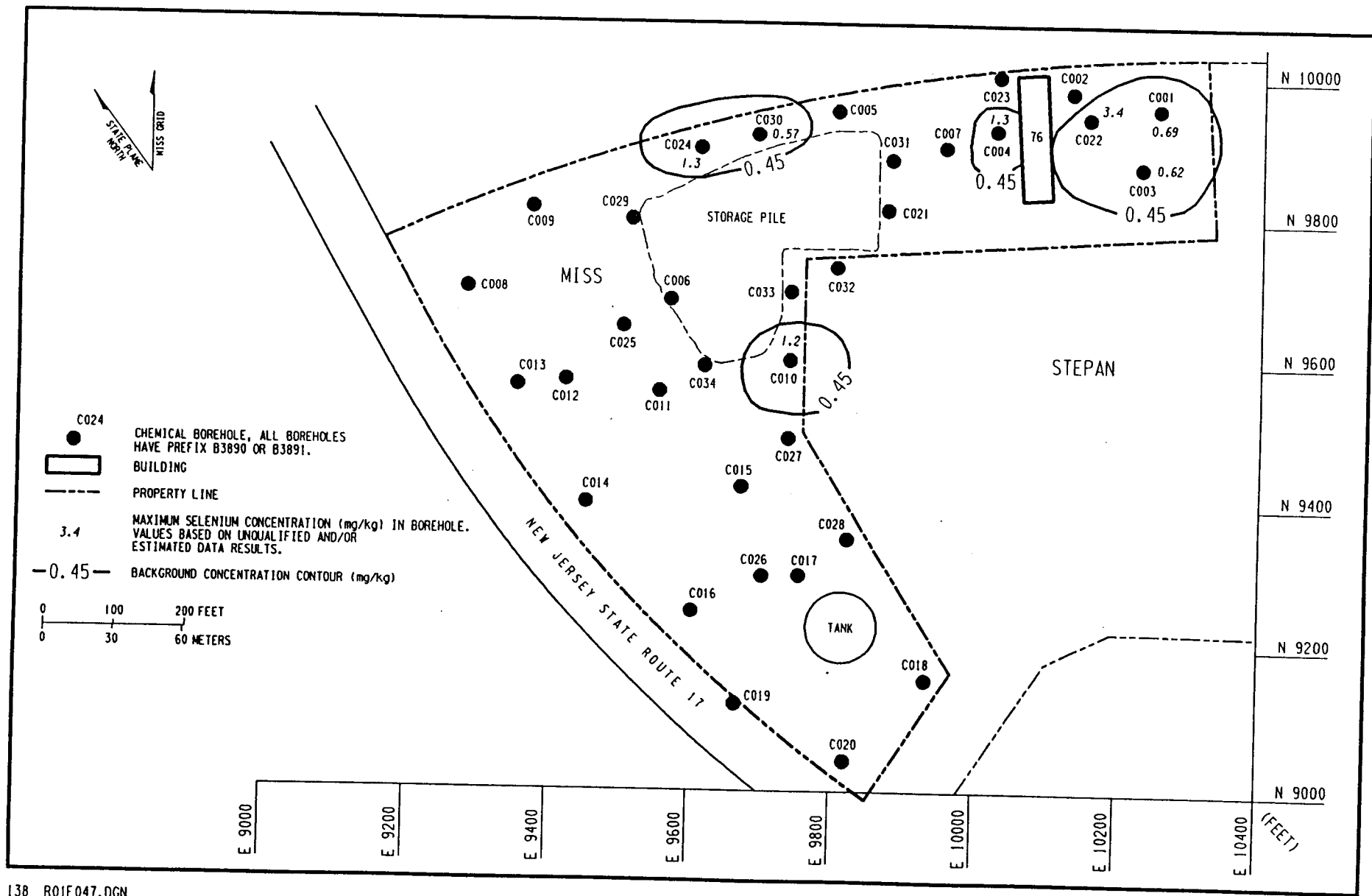
4-142



138 ROIF023.DGN F12

Figure 4-33
Total Lithium in Soil at MISS

4-143



138 ROIF047.DGN

Figure 4-34
Total Selenium in Soil at MISS

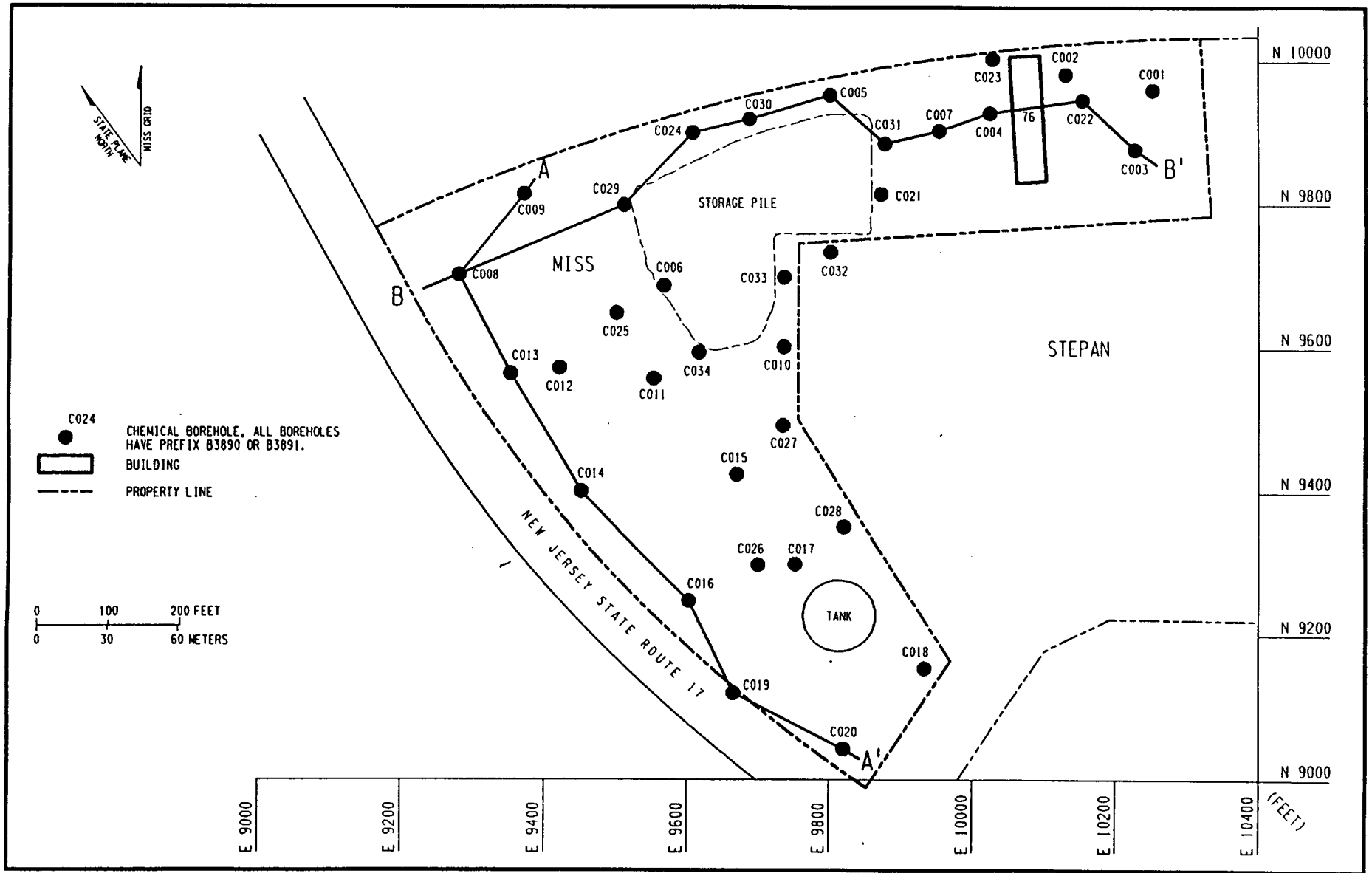


Figure 4-35
Locations of Cross Sections A-A' and B-B' Showing Rare Earth Elements/
Lithium/Radioactive Contamination at MISS

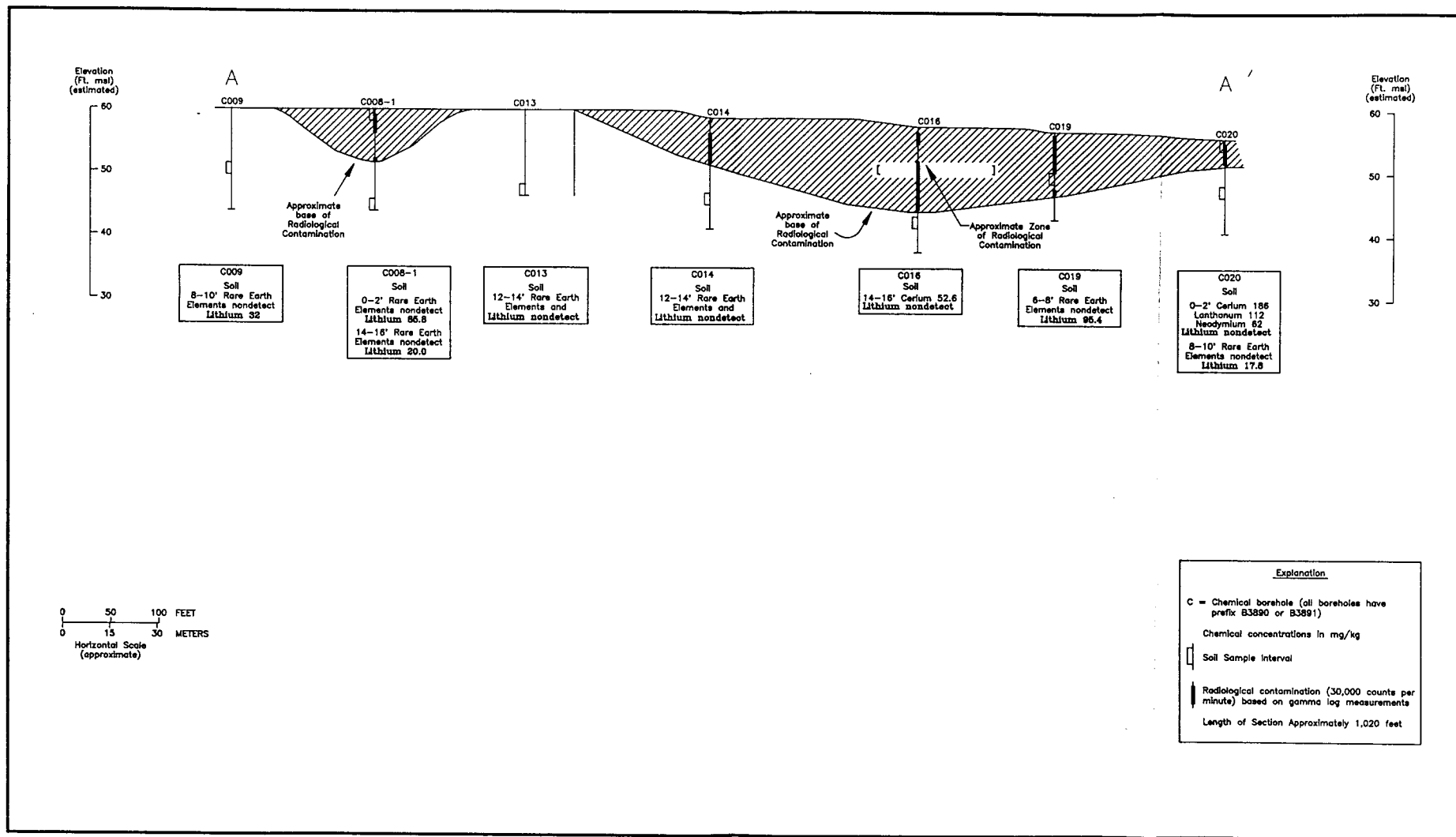


Figure 4-36
MISS Cross Section A-A'

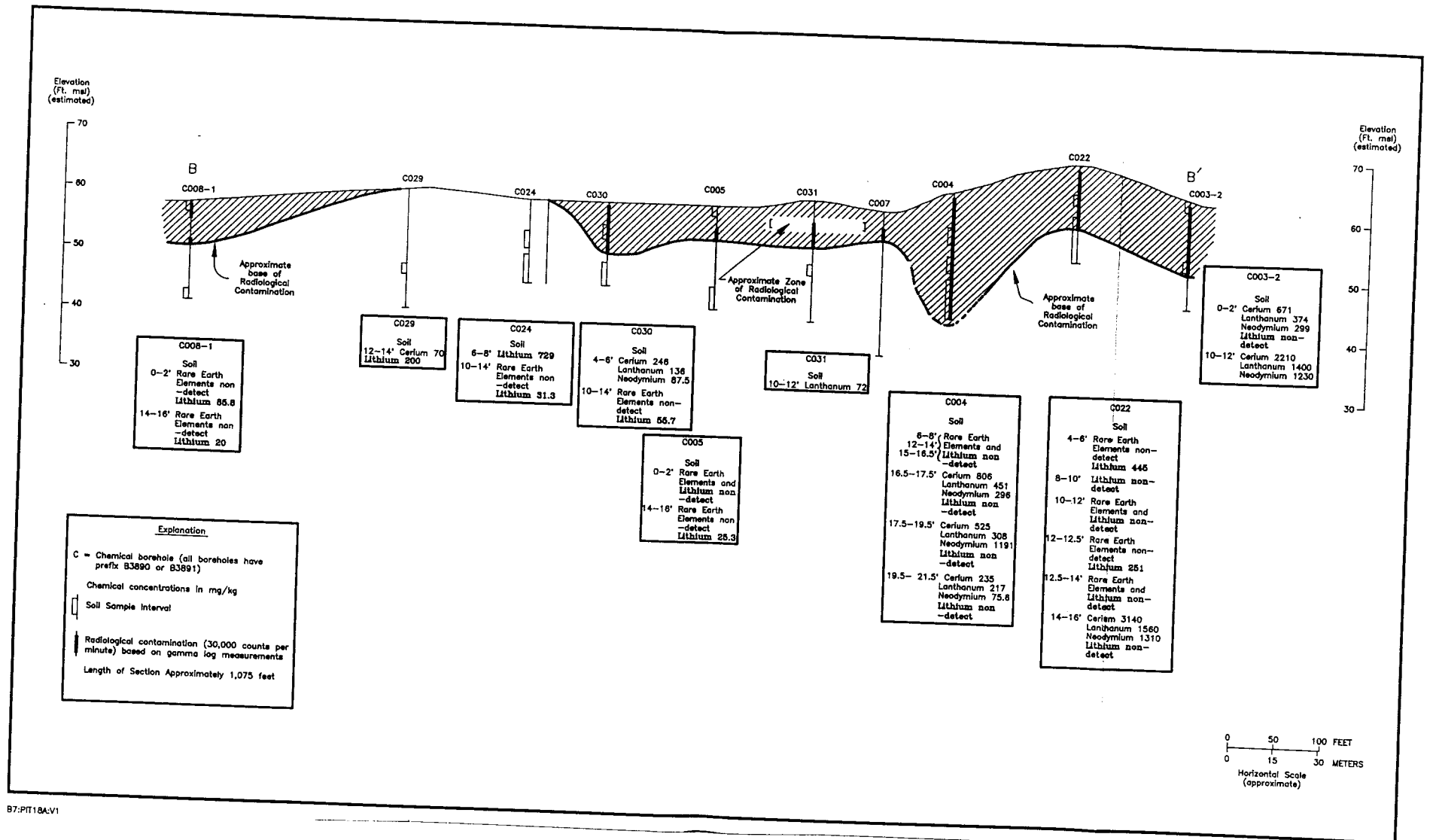
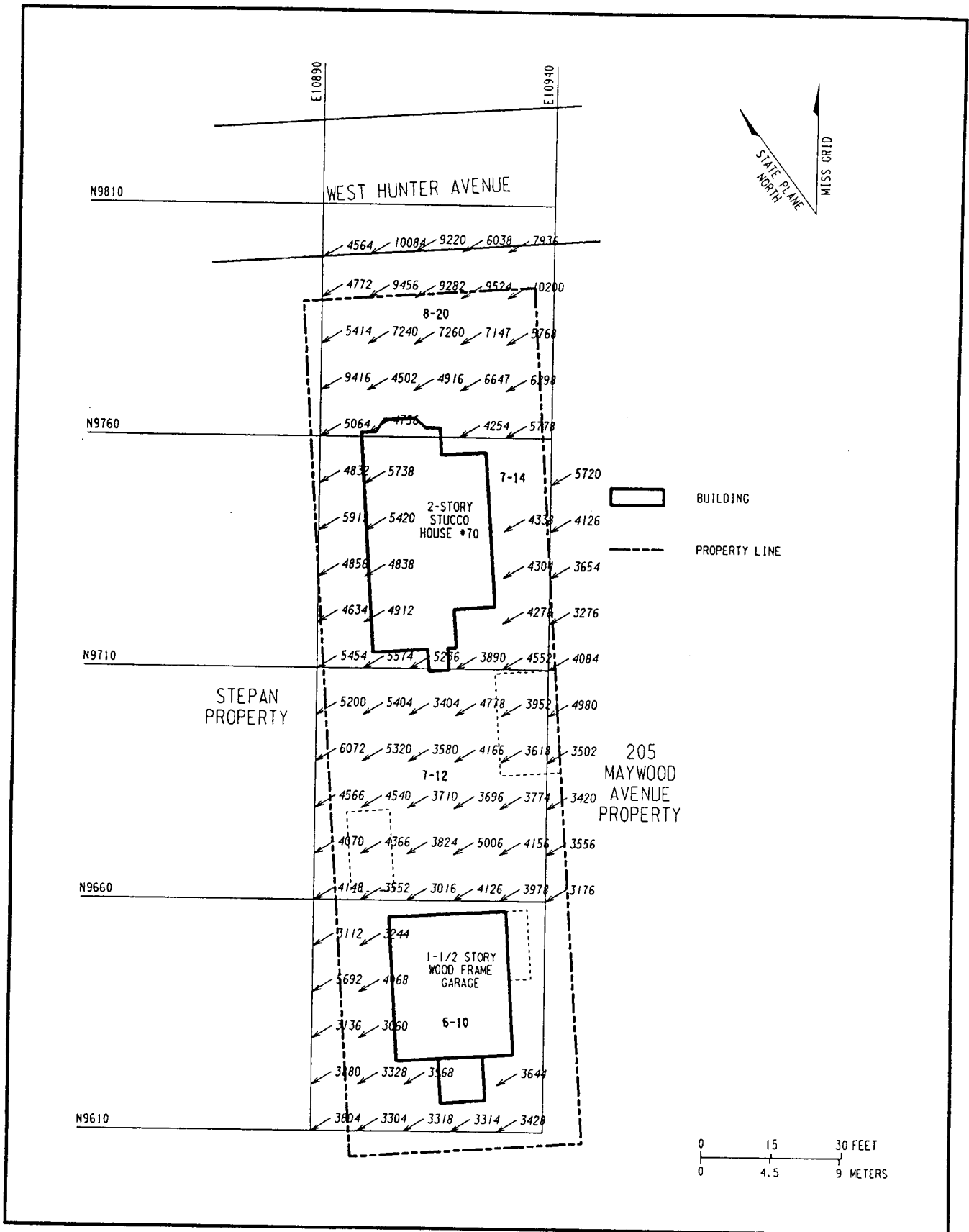
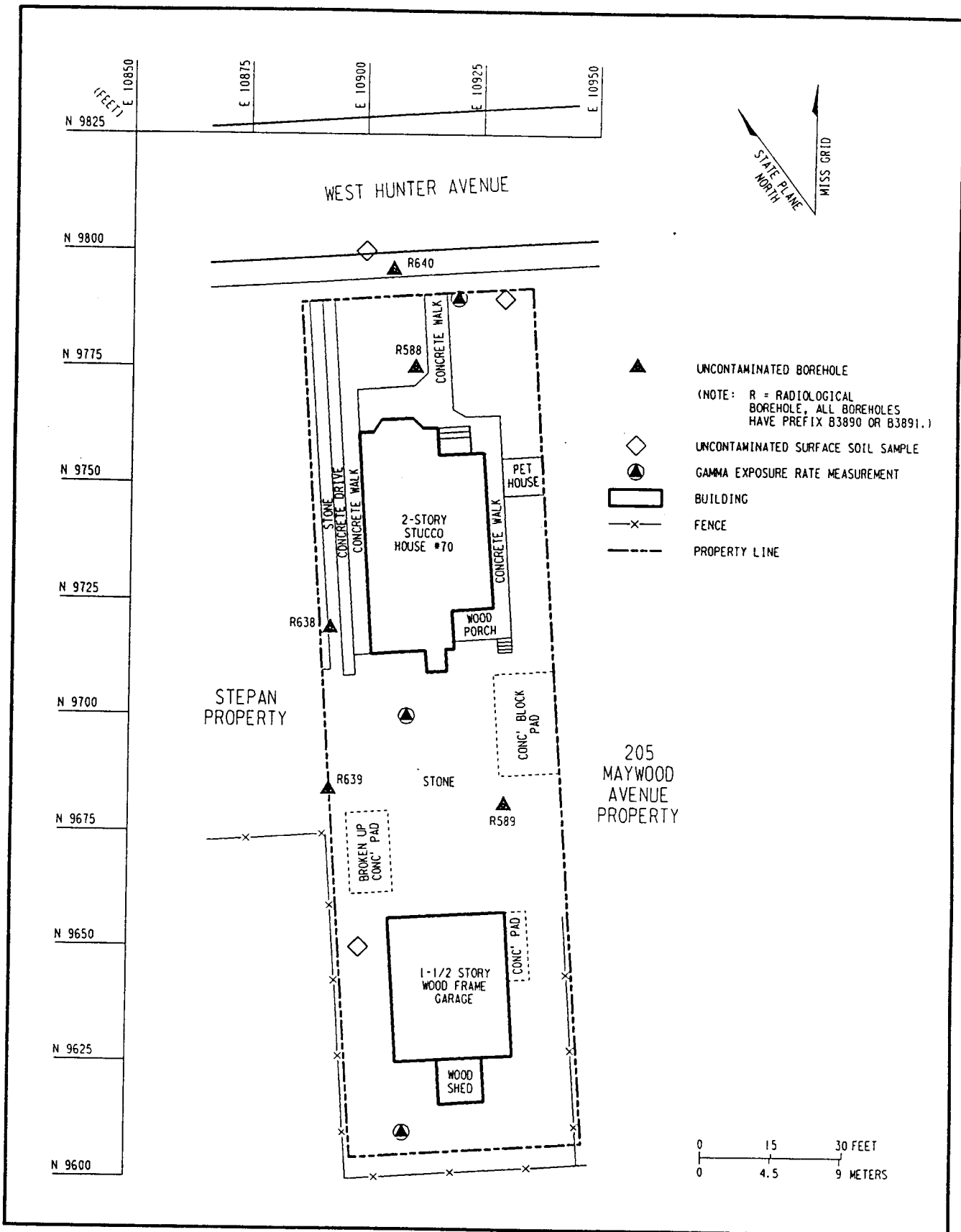


Figure 4-37
MISS Cross Section B-B'



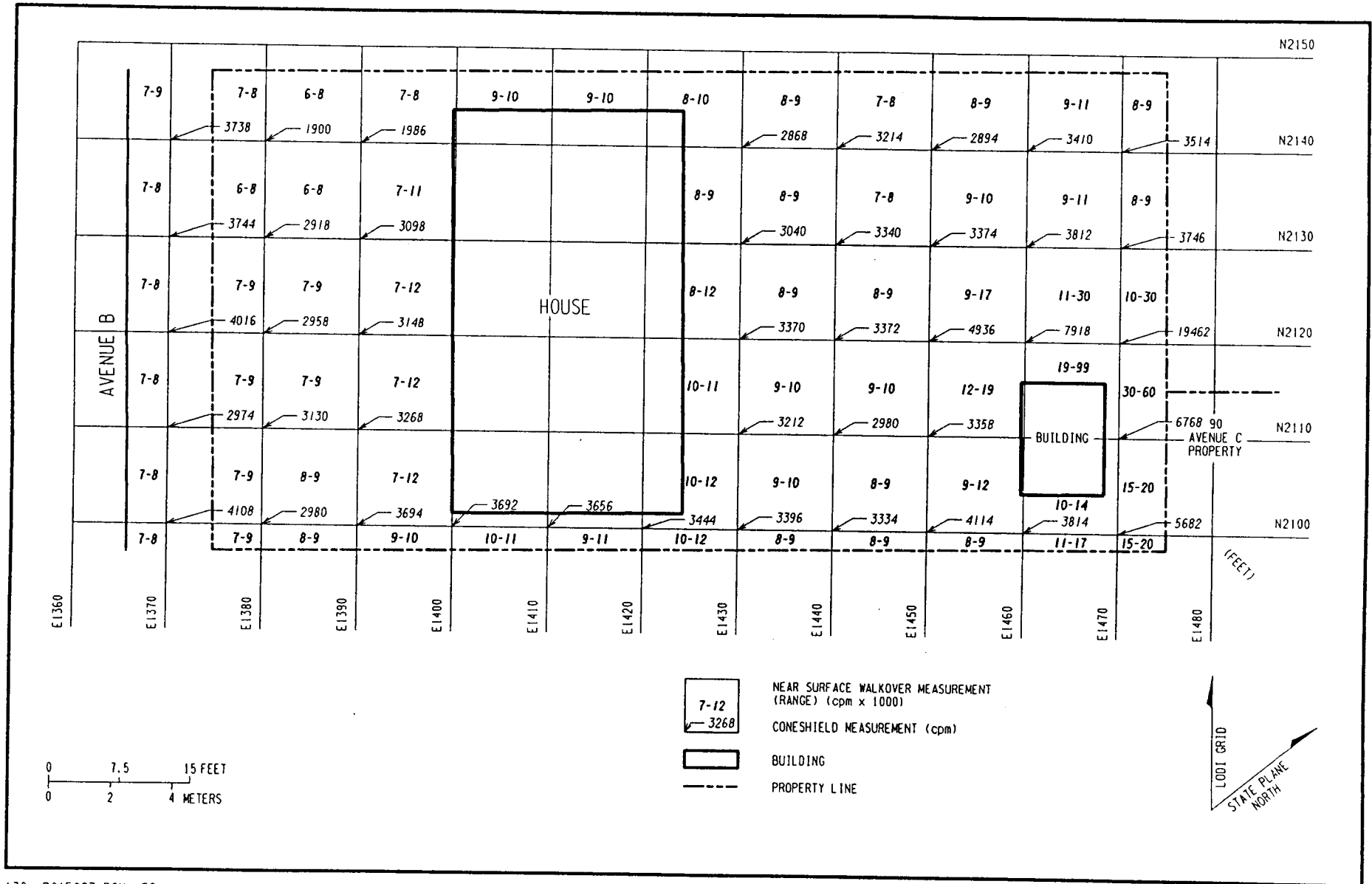
138 R01F006.DGN F2

Figure 4-38
Near-Surface and Coneshield Walkover Measurements at
70 West Hunter Avenue



138 R01F006.DGN

Figure 4-39
70 West Hunter Avenue Boreholes and Surface Soil Sampling Locations



138 ROIF007.DGN F2

Figure 4-40
Near-Surface and Coneshield Walkover Measurements at 79 Avenue B

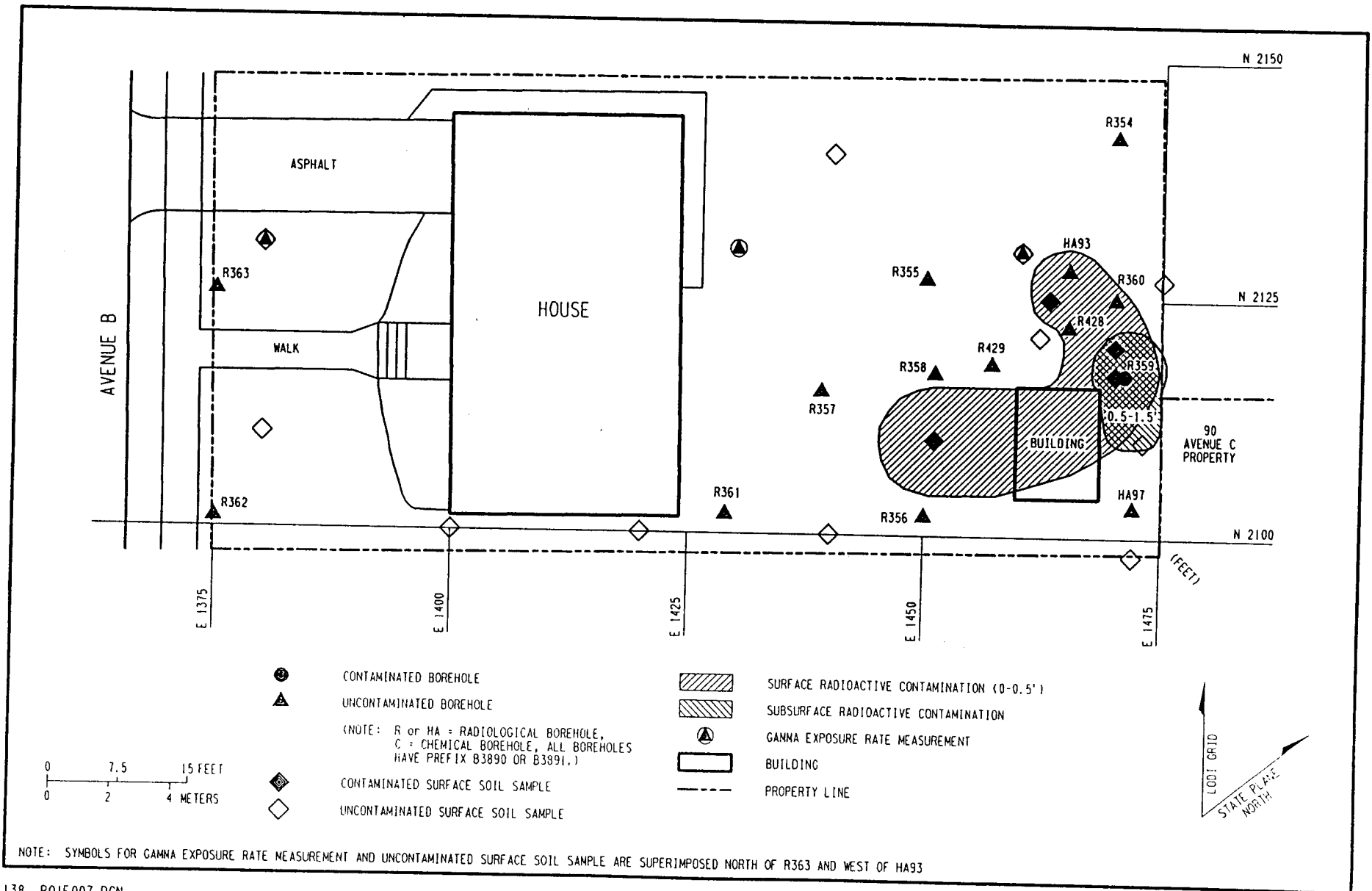
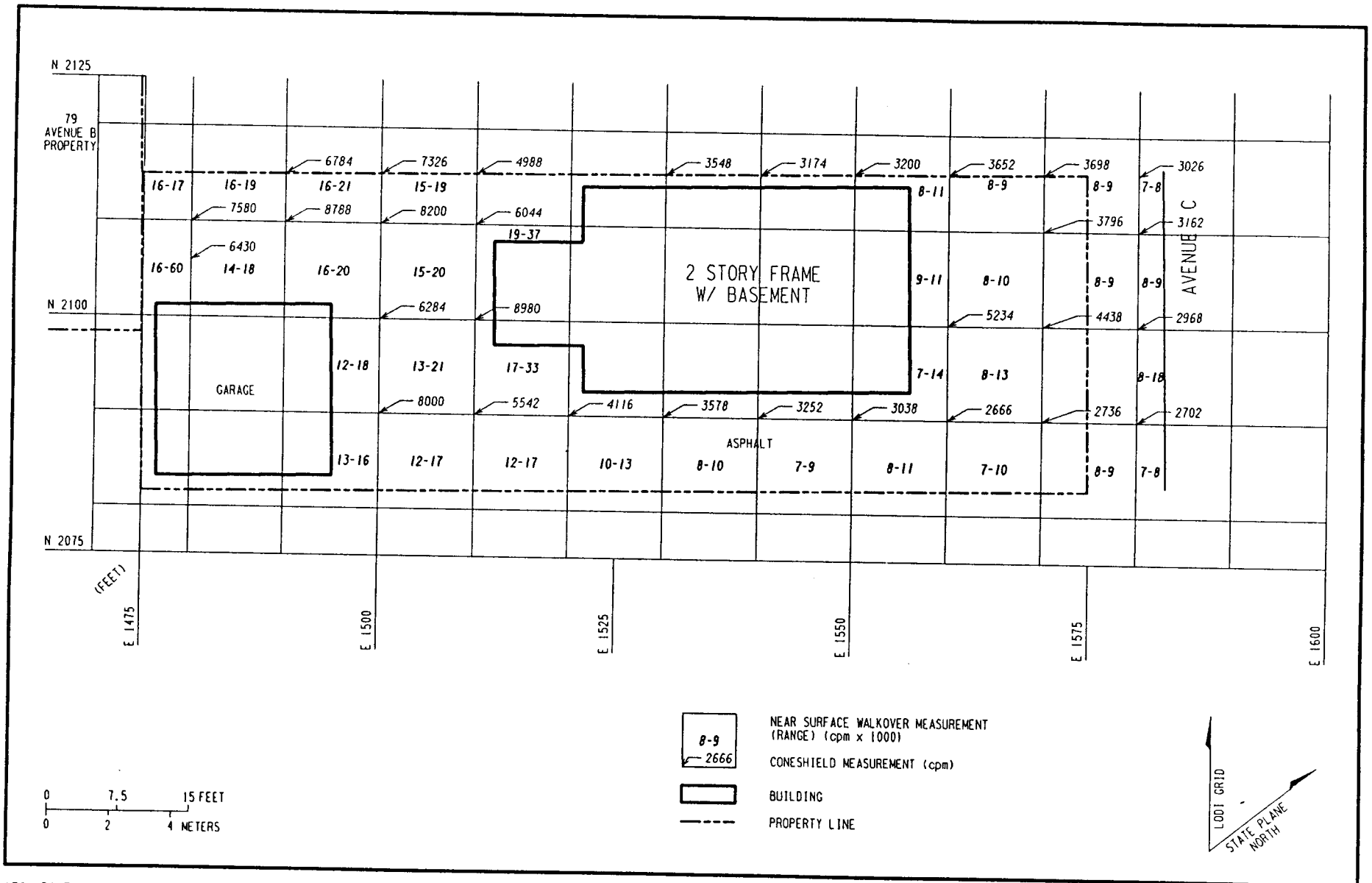


Figure 4-41
79 Avenue B Sampling Locations and Areas of Radioactive Contamination



138 ROIF008.DCN F2

Figure 4-42
Near-Surface and Coneshield Walkover Measurements at 90 Avenue C

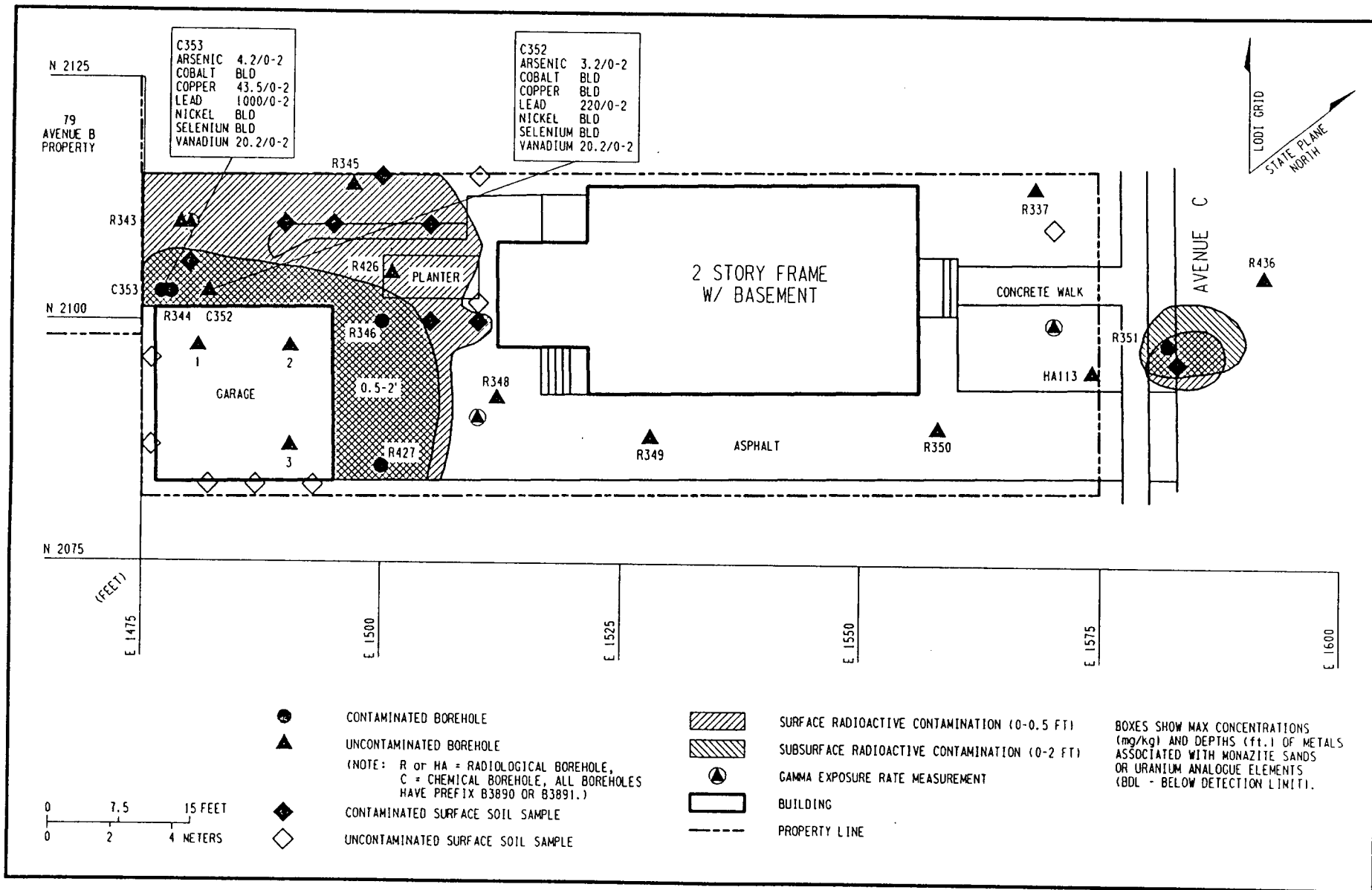
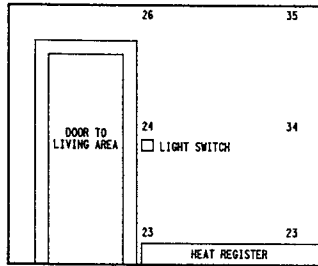


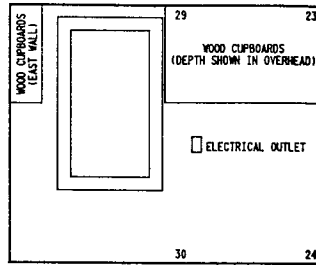
Figure 4-43
 90 Avenue C Sampling Locations and Areas of Radioactive Contamination

42 = GAMMA MEASUREMENTS IN COUNTS PER MINUTE x 1000
 (108) = BETA-GAMMA MEASUREMENTS IN COUNTS PER MINUTE
 N/A = NO BETA-GAMMA MEASUREMENT WAS TAKEN
 BACKGROUND = 7,500 cpm

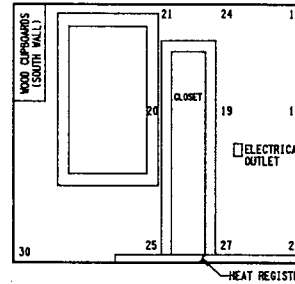
NORTHERN WALL



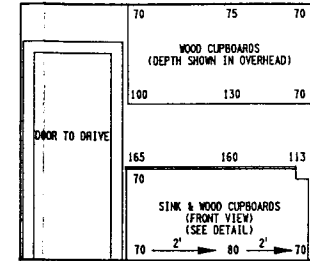
SOUTHERN WALL



WESTERN WALL



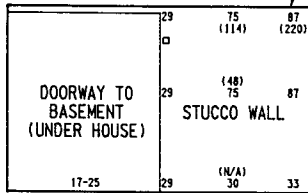
EASTERN WALL



GAMMA EXPOSURE MEASUREMENT
 WAS 42 uR/h AT 1M ABOVE FLOOR
 IN FRONT OF SINK

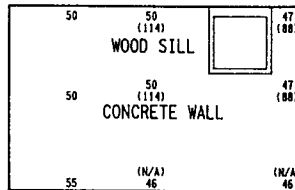
1ST FLOOR

NORTHERN WALL

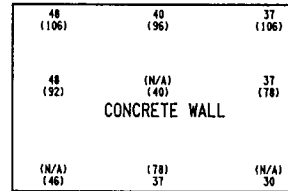


SAMPLE OF WALL MATERIAL
 FROM THIS LOCATION HAD
 60 pCi/g OF THORIUM-232

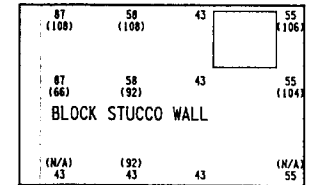
SOUTHERN WALL



WESTERN WALL



EASTERN WALL



GAMMA EXPOSURE MEASUREMENT
 WAS 40 uR/h AT 1M ABOVE FLOOR
 IN CENTER OF BASEMENT

BASEMENT

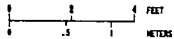
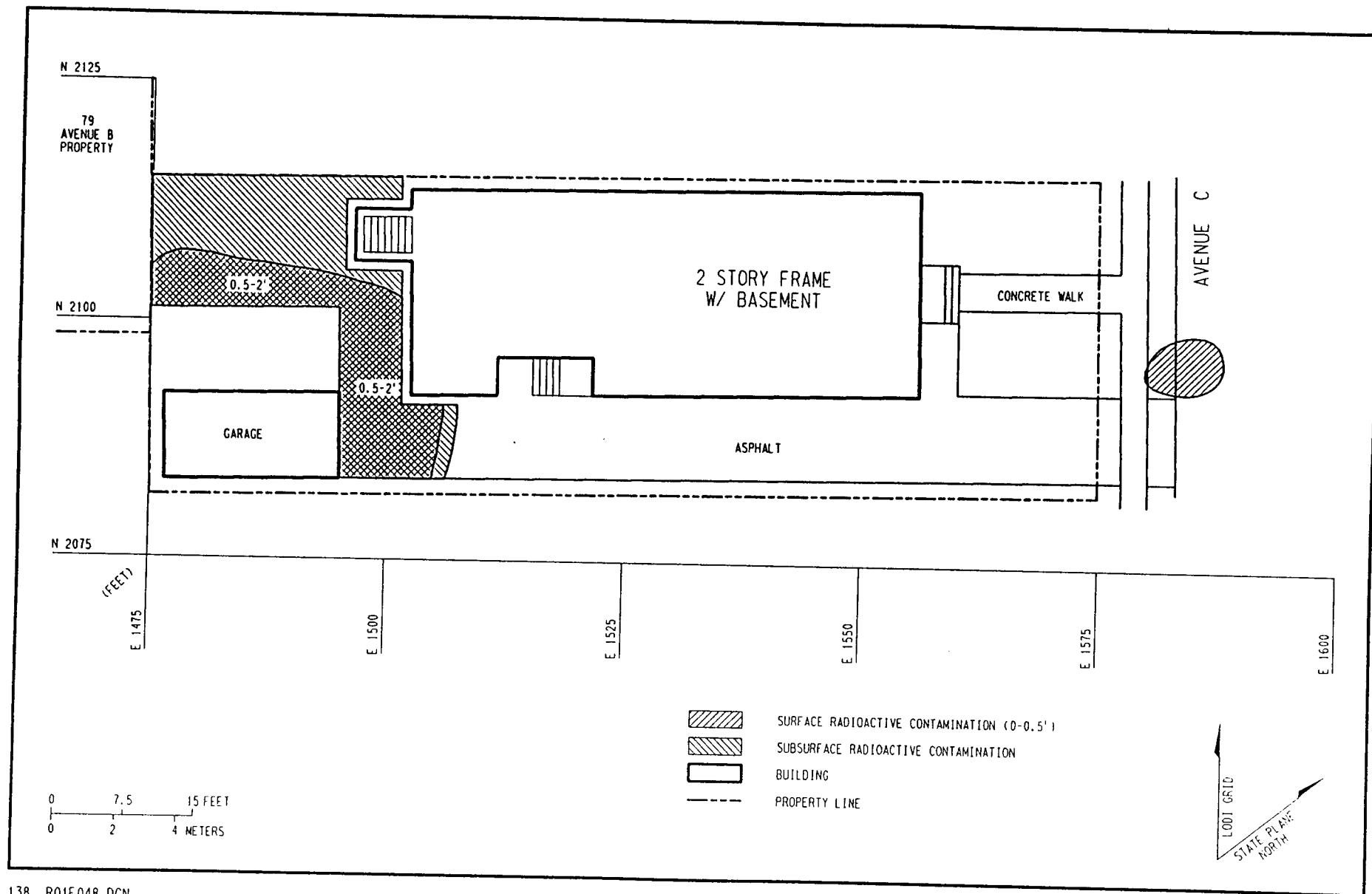


Figure 4-44
 90 Avenue C Indoor Gamma and Beta-Gamma Measurement Locations

4-157



138 R01F048.DGN

Figure 4-45
90 Avenue C Radiological Condition After Removal Action

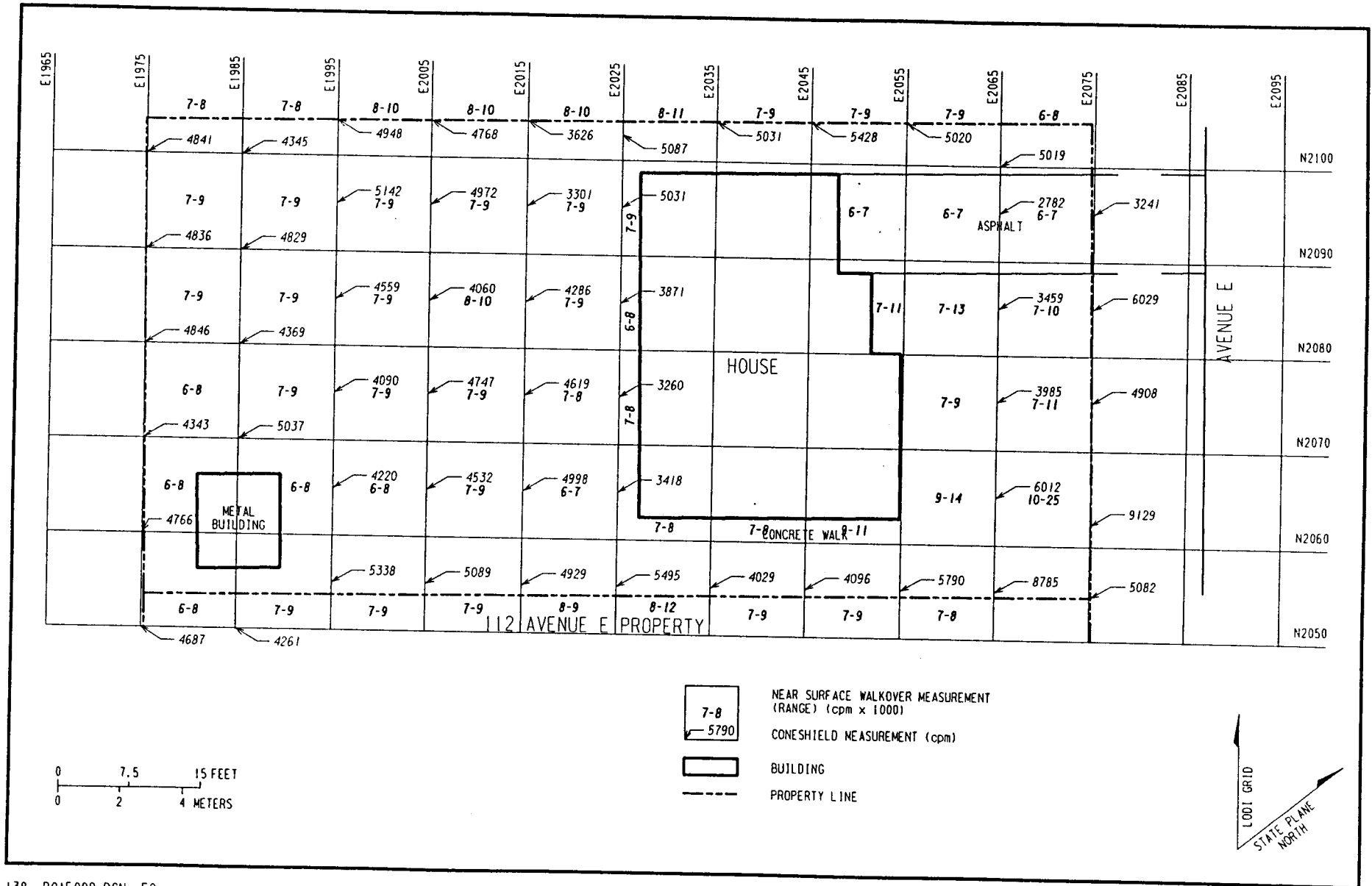
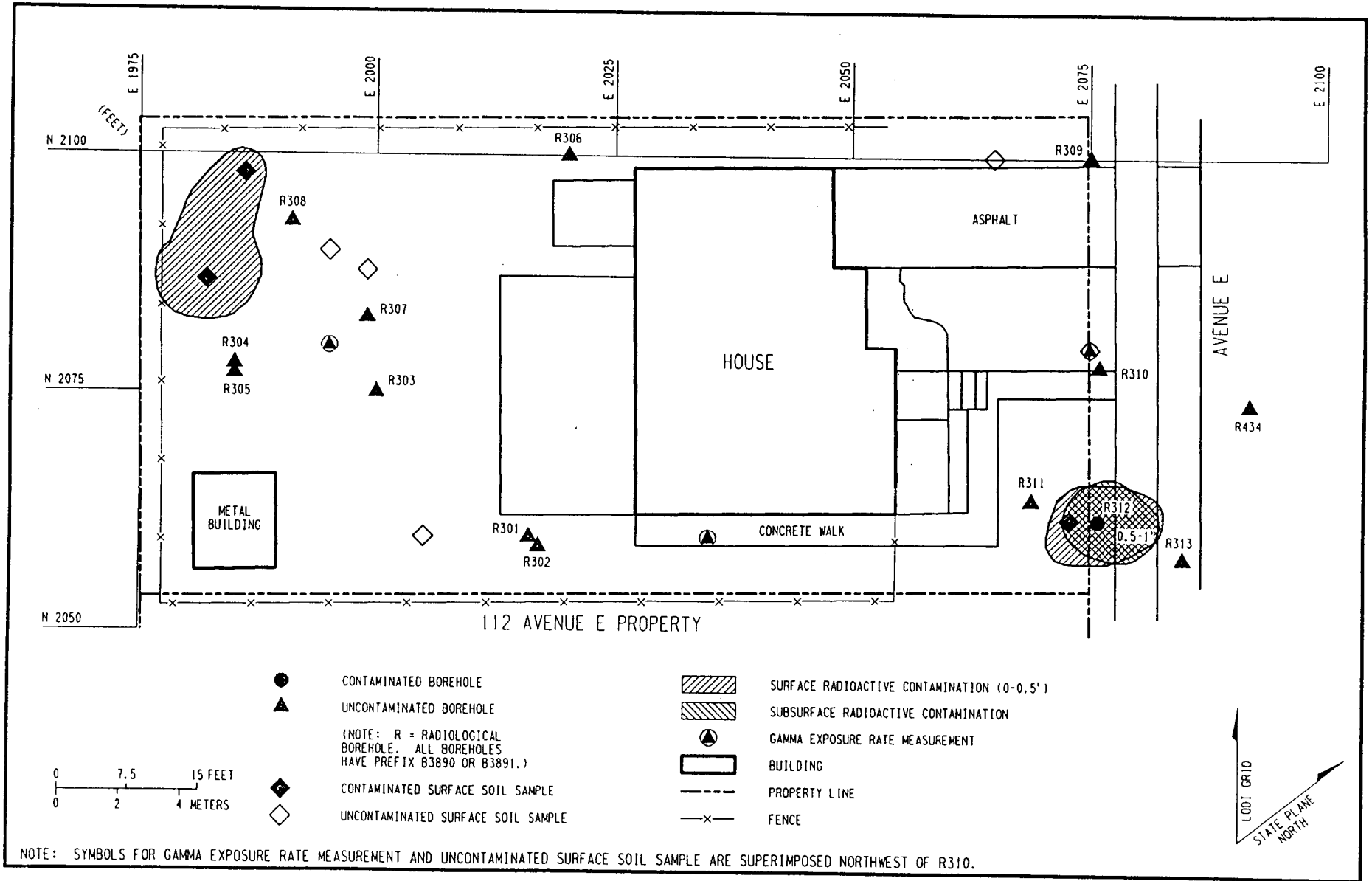


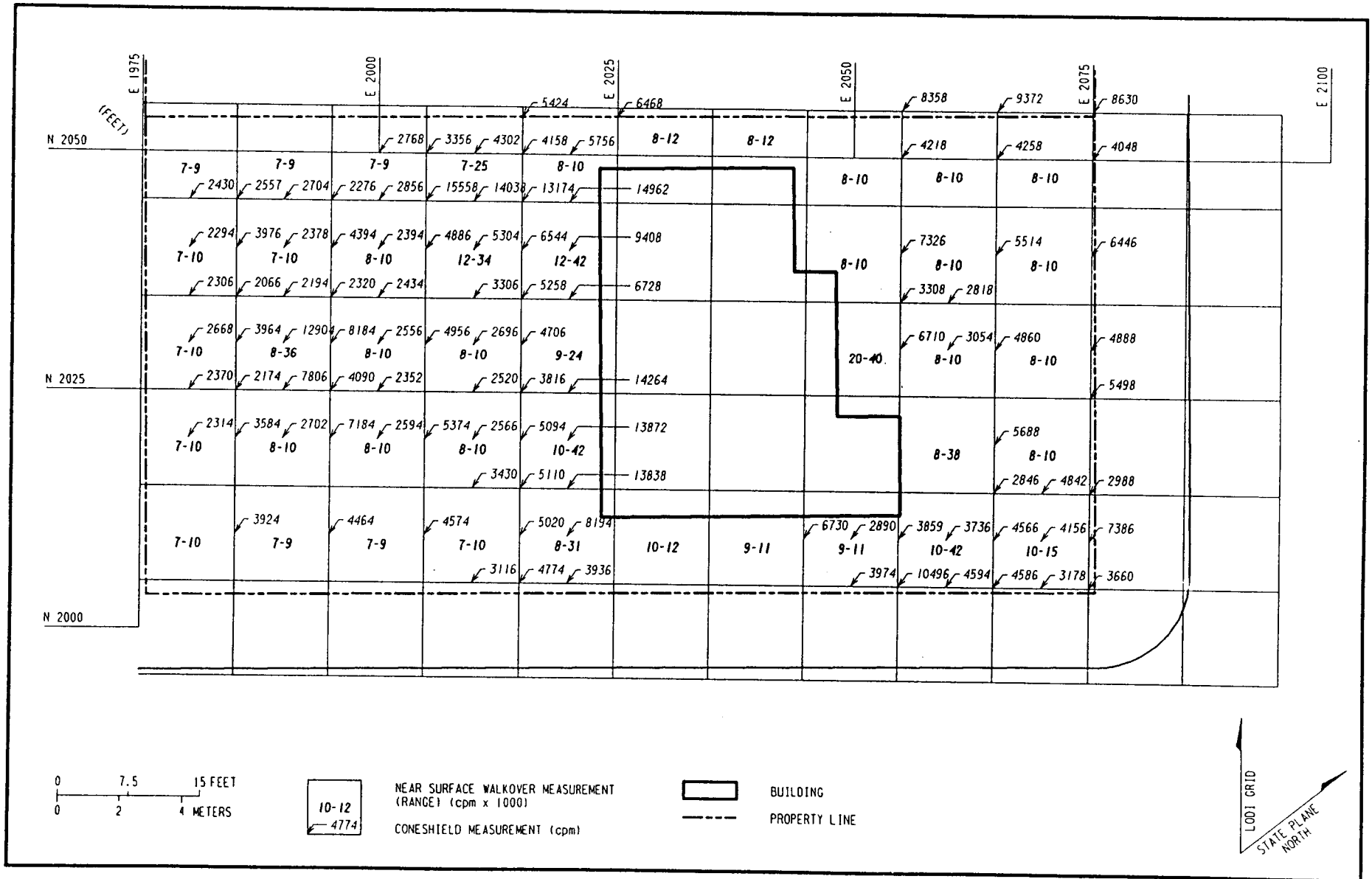
Figure 4-46
Near-Surface and Coneshield Walkover Measurements at 108 Avenue E



138 RO1F009.DGN F1

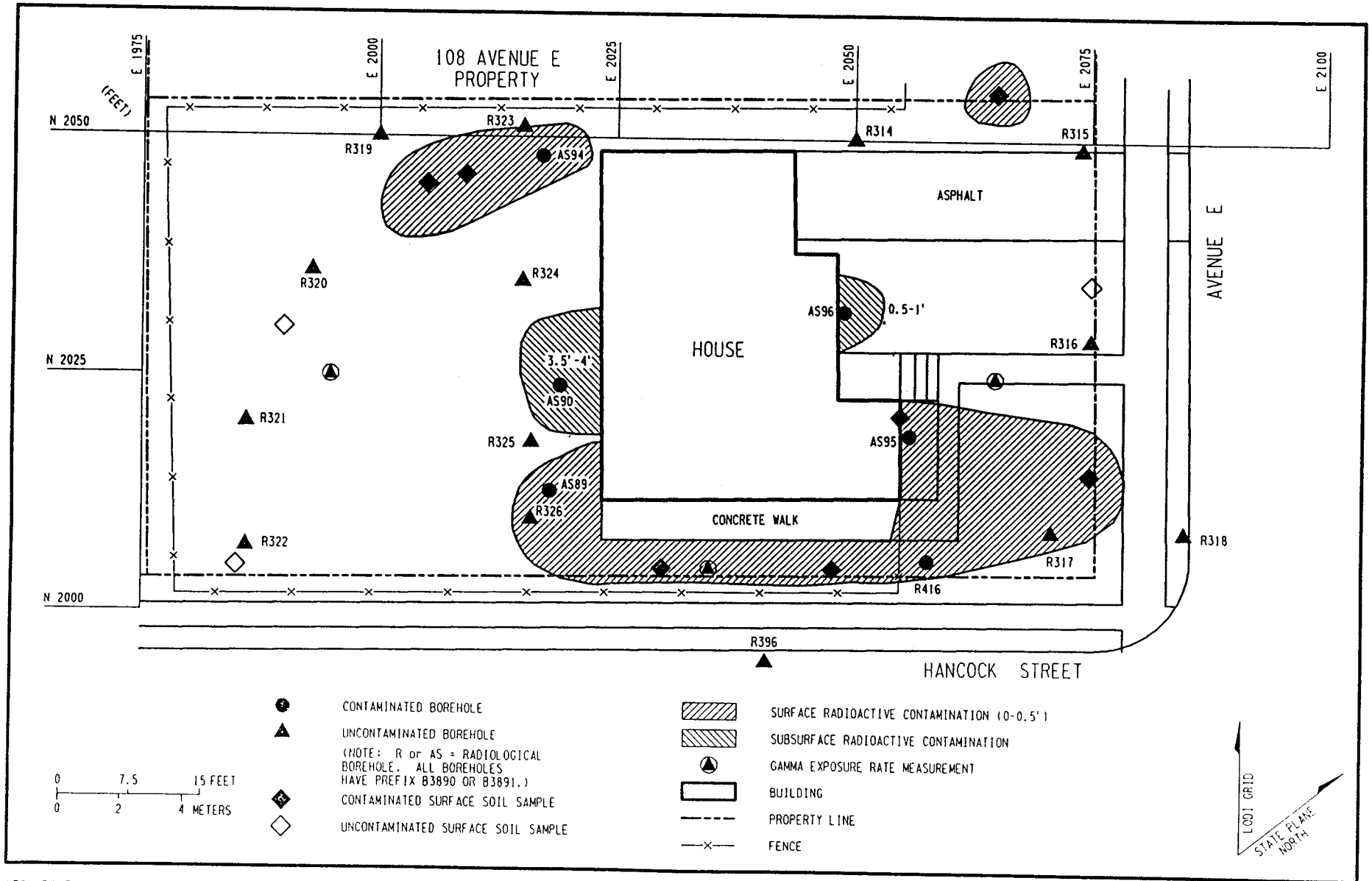
Figure 4-47
108 Avenue E Sampling Locations and Areas of Radioactive Contamination

4-160



138 ROIF010.DGN F2

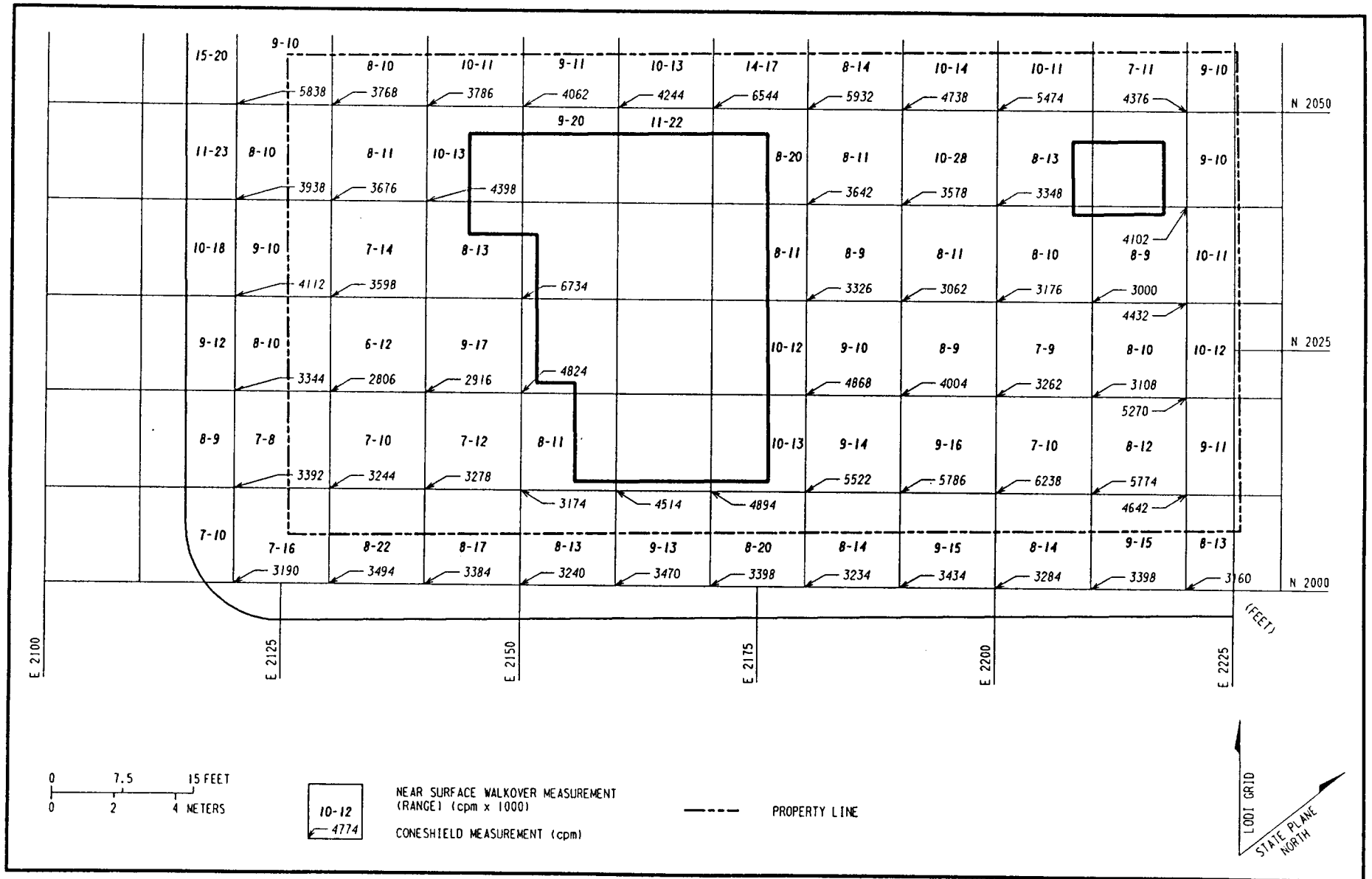
Figure 4-48
Near-Surface and Coneshield Walkover Measurements at 112 Avenue E



138 ROIF010.DGN

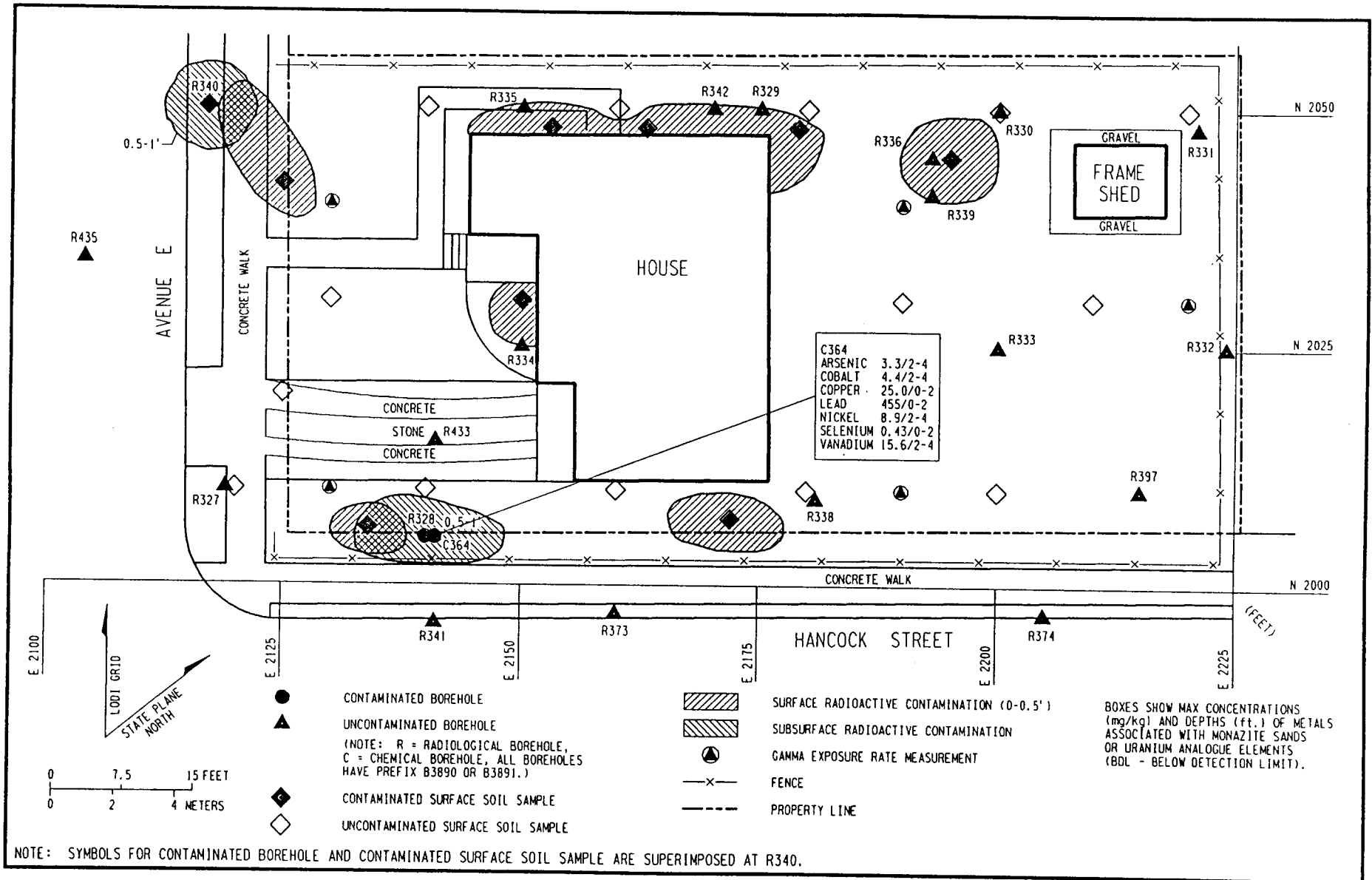
Figure 4-49
112 Avenue E Sampling Locations and Areas of Radioactive Contamination

4-162



138 ROIF011.DGN F3

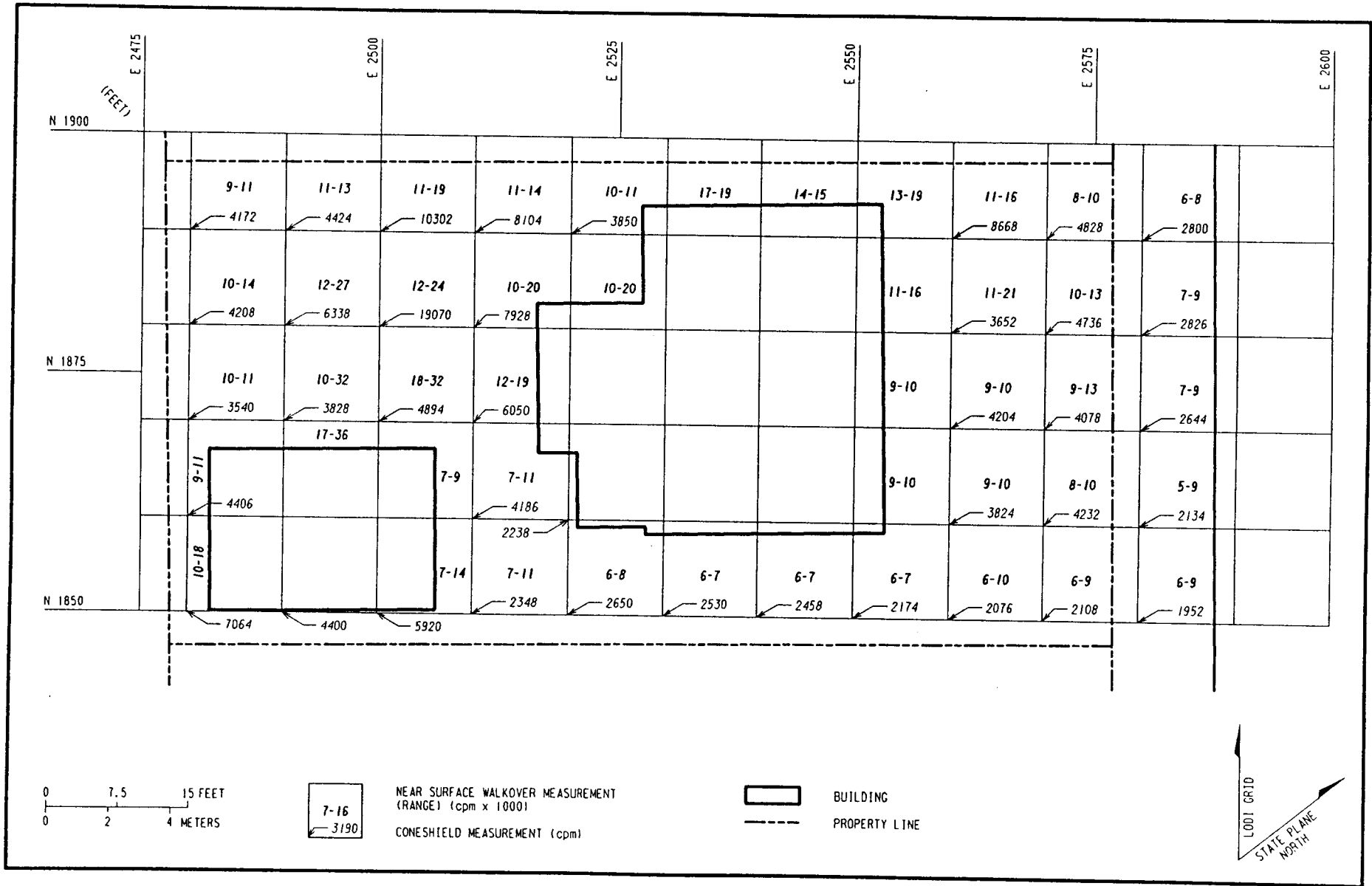
Figure 4-50
Near-Surface and Coneshield Walkover Measurements at 113 Avenue E



138 ROIF011.DGN F1

Figure 4-51
113 Avenue E Sampling Locations and Areas of Radioactive Contamination

4-164



138 R01F012.DGN F3

Figure 4-52
Near-Surface and Coneshield Walkover Measurements at 62 Trudy Drive

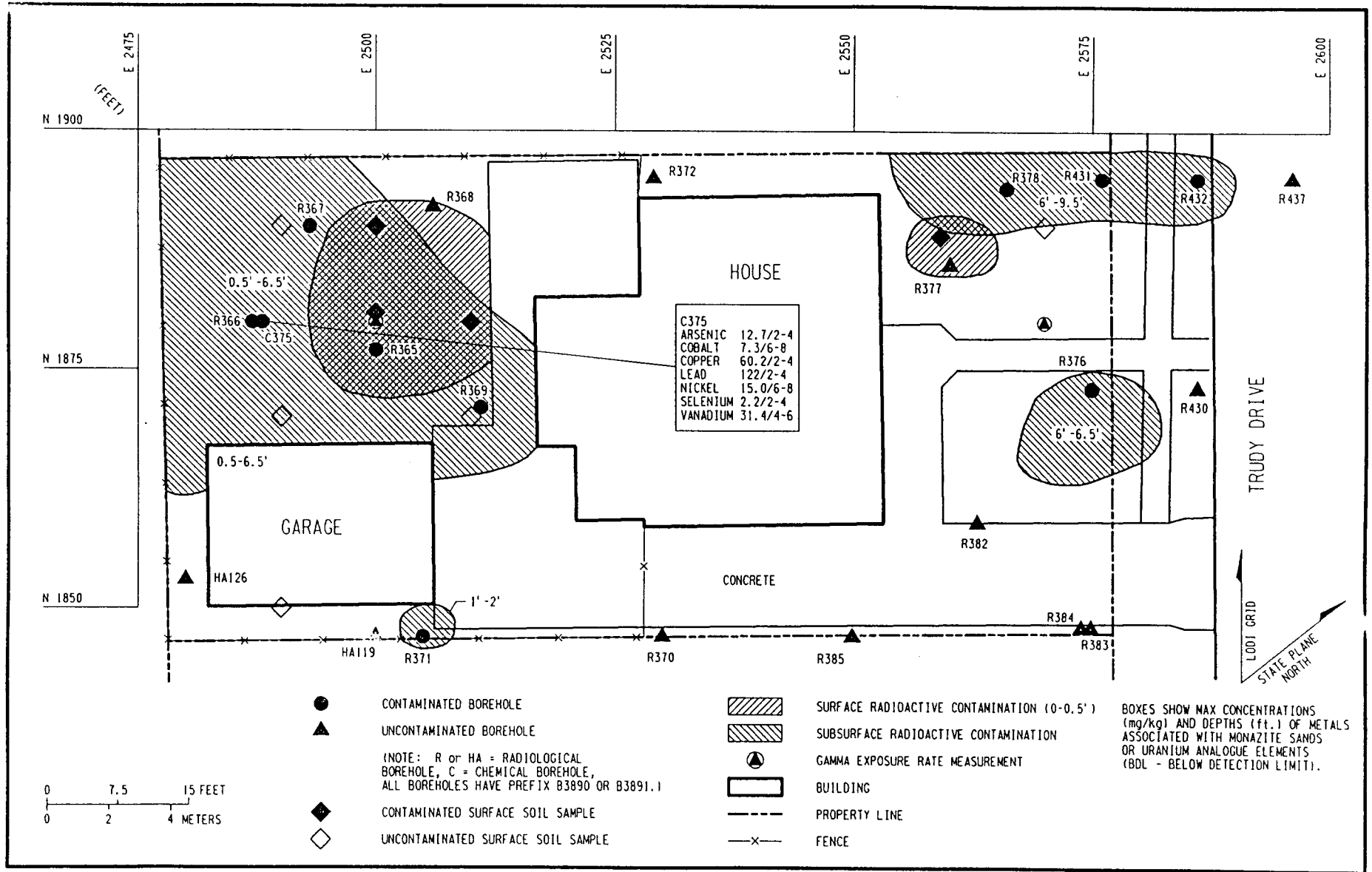
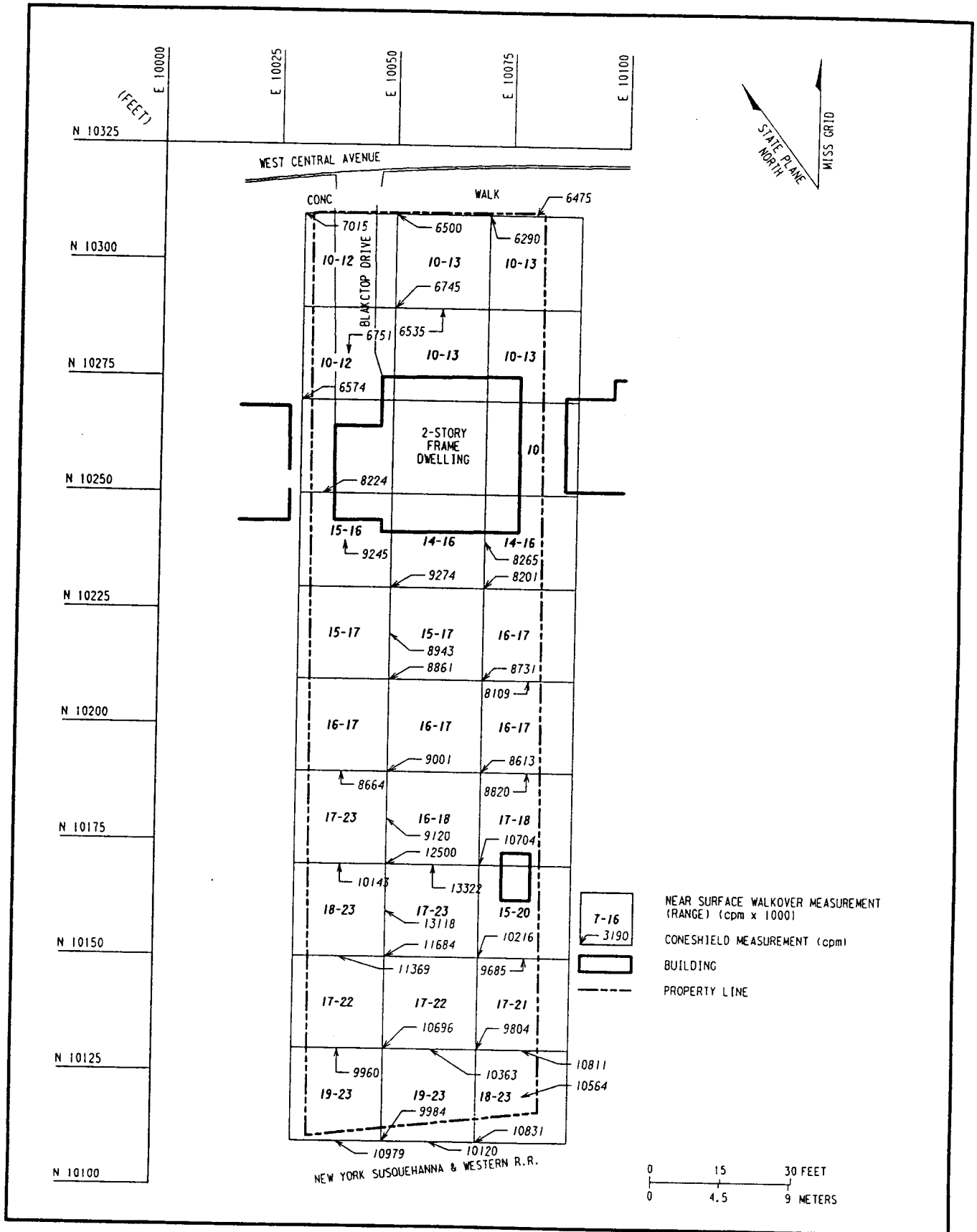
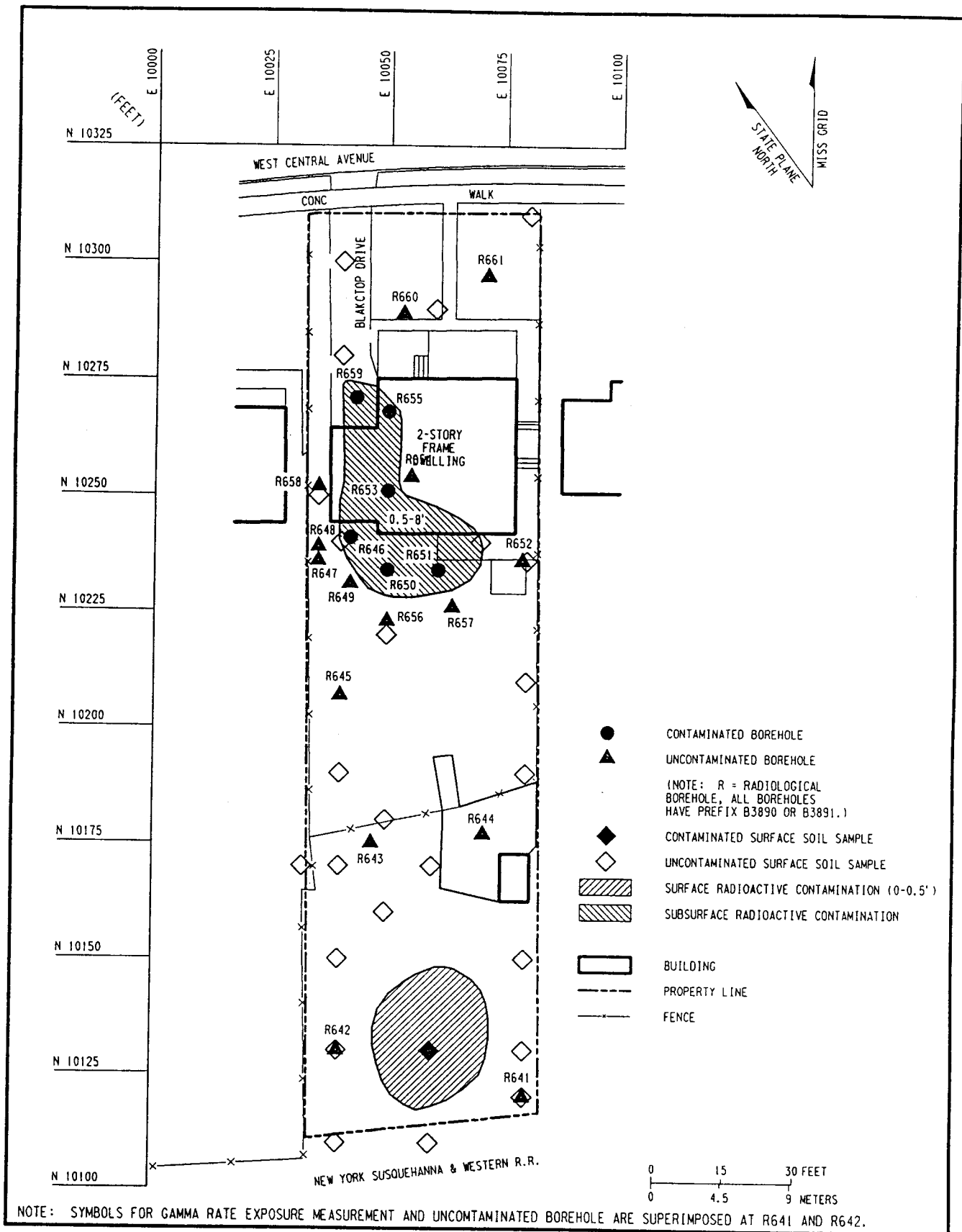


Figure 4-53
62 Trudy Drive Sampling Locations and Areas of Radioactive Contamination



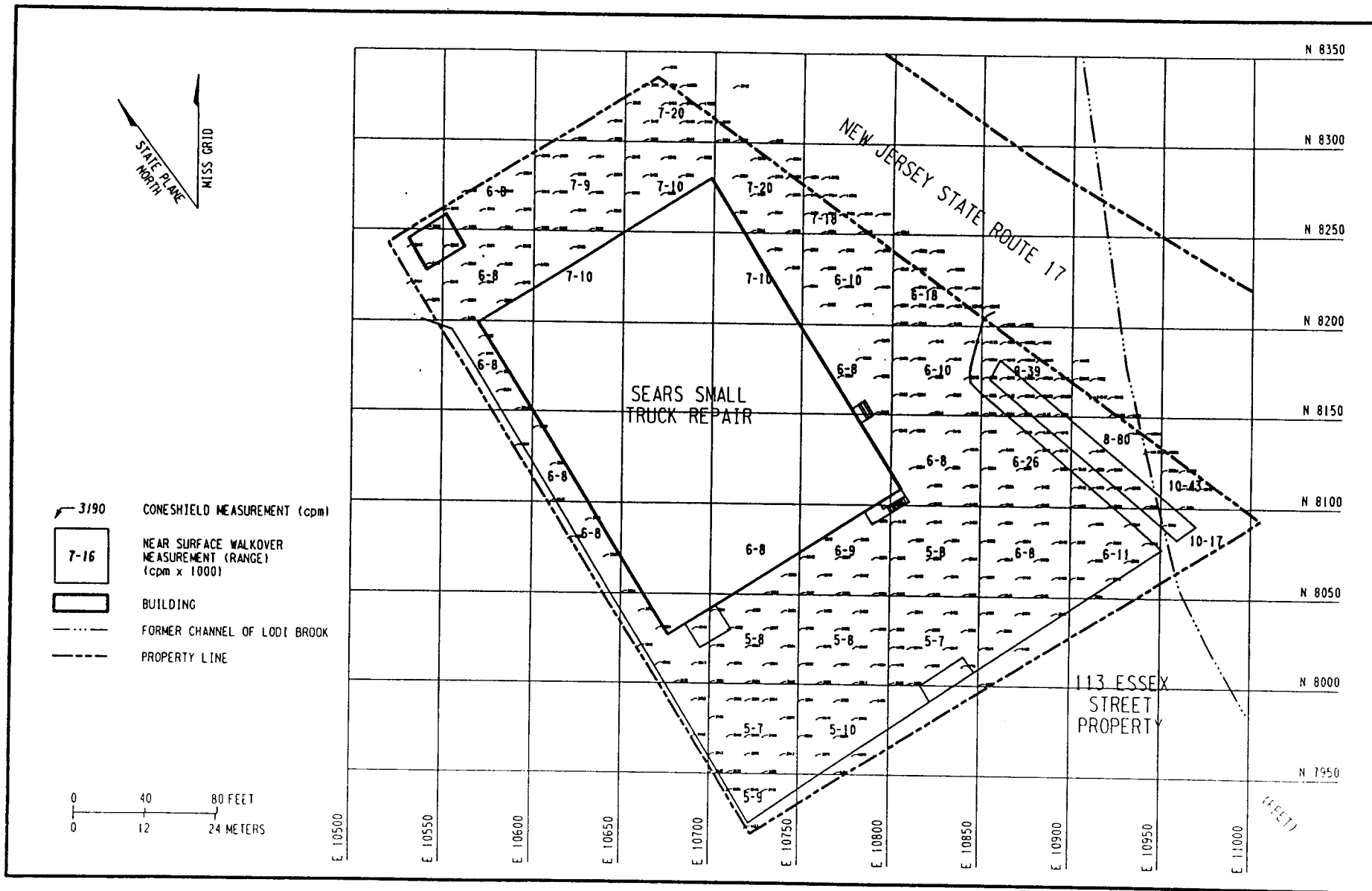
138 R01F013.DGN F2

Figure 4-54
 Near-Surface and Coneshield Walkover Measurements at
 136 West Central Avenue



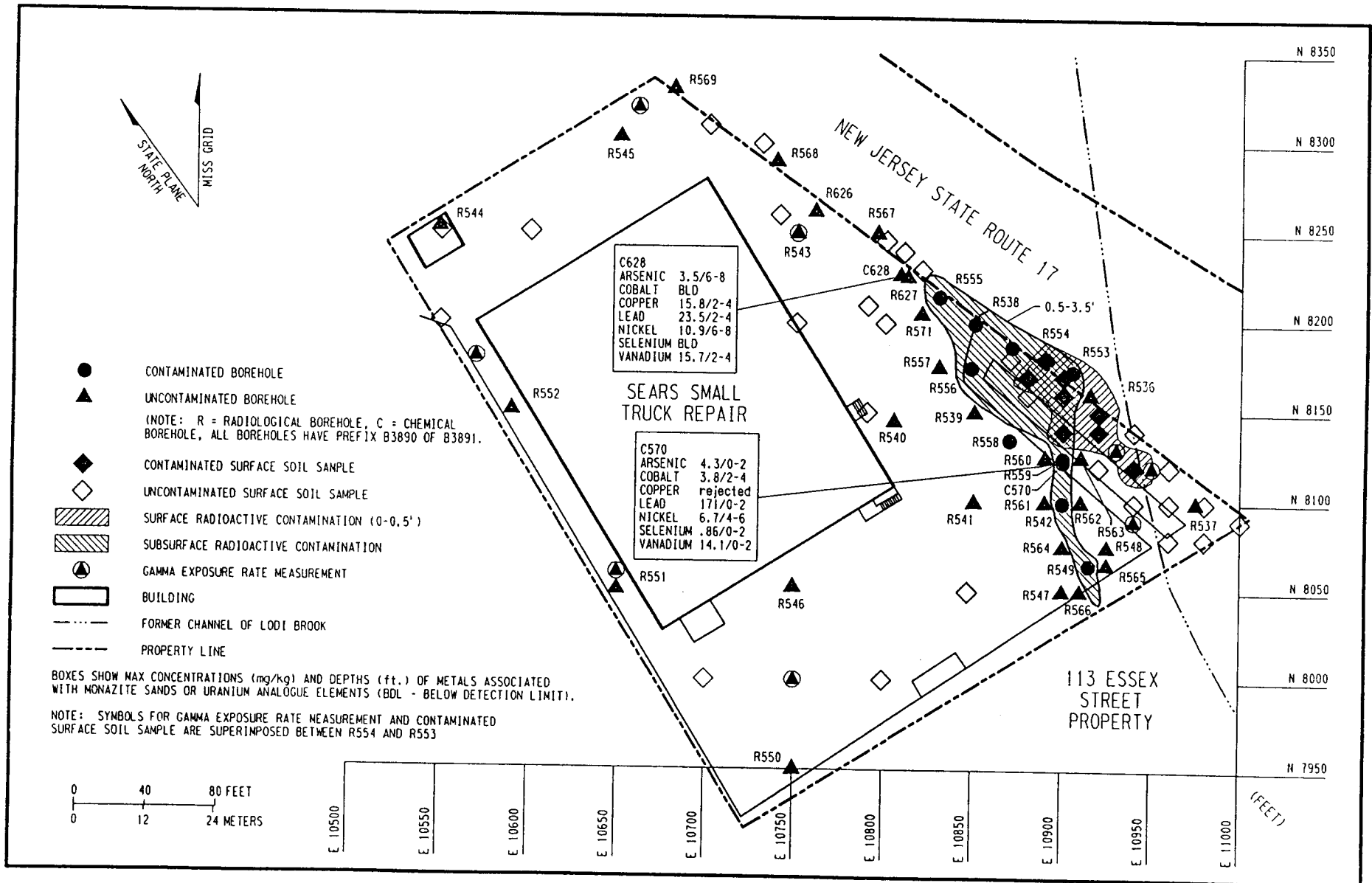
138 R01F013.DGN F1

Figure 4-55
 136 West Central Avenue Sampling Locations and
 Areas of Radioactive Contamination



138 ROIF014.DGN F3

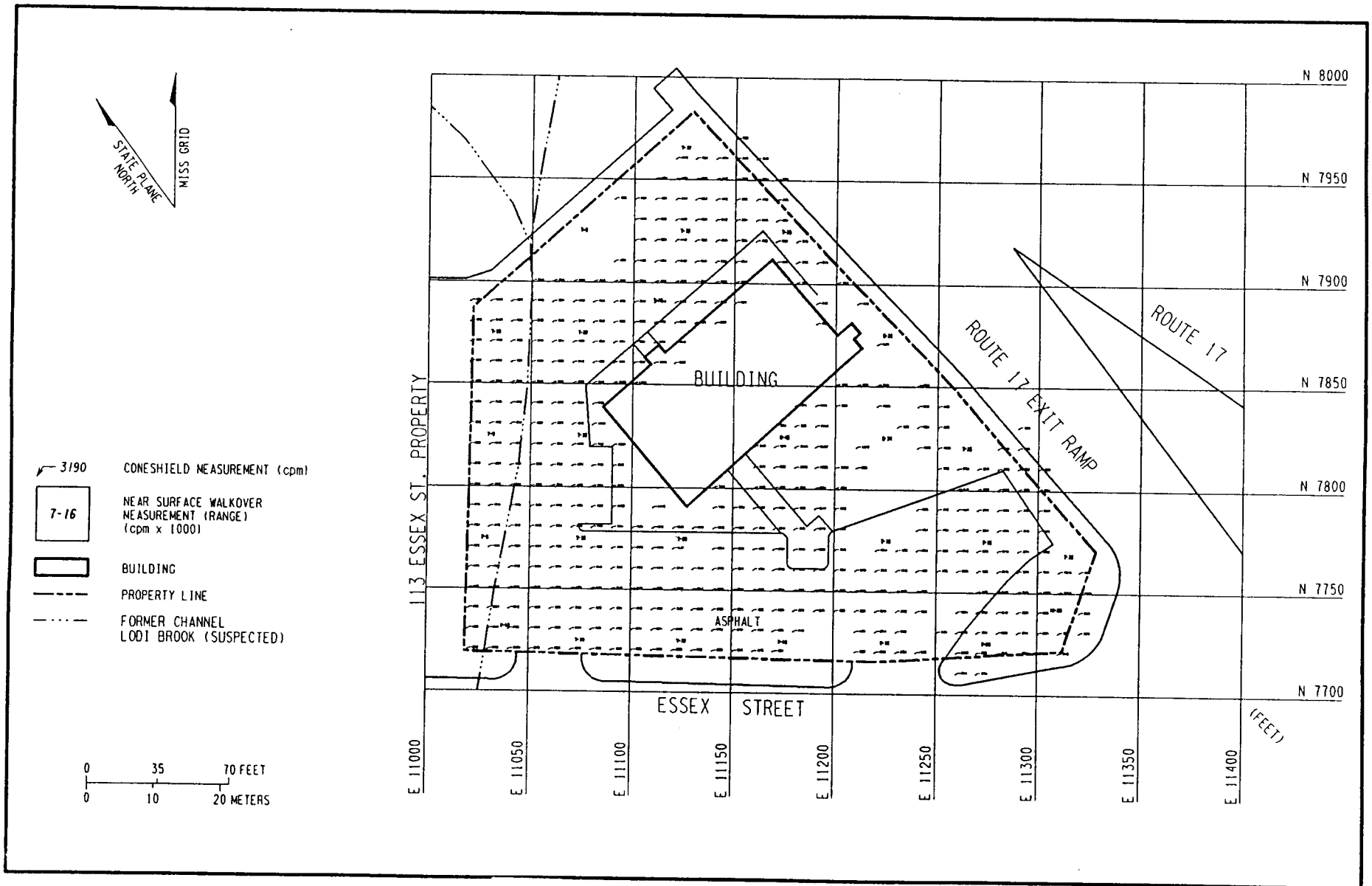
Figure 4-56
Near-Surface and Coneshield Walkover Measurements at
200 State Route 17



138 ROIF014.DGN F1

Figure 4-57
200 State Route 17 Sampling Locations and
Areas of Radioactive Contamination

4-170



138 ROIF015.DGN

Figure 4-58
Near-Surface and Coneshield Walkover Measurements at
Essex Street and State Route 17

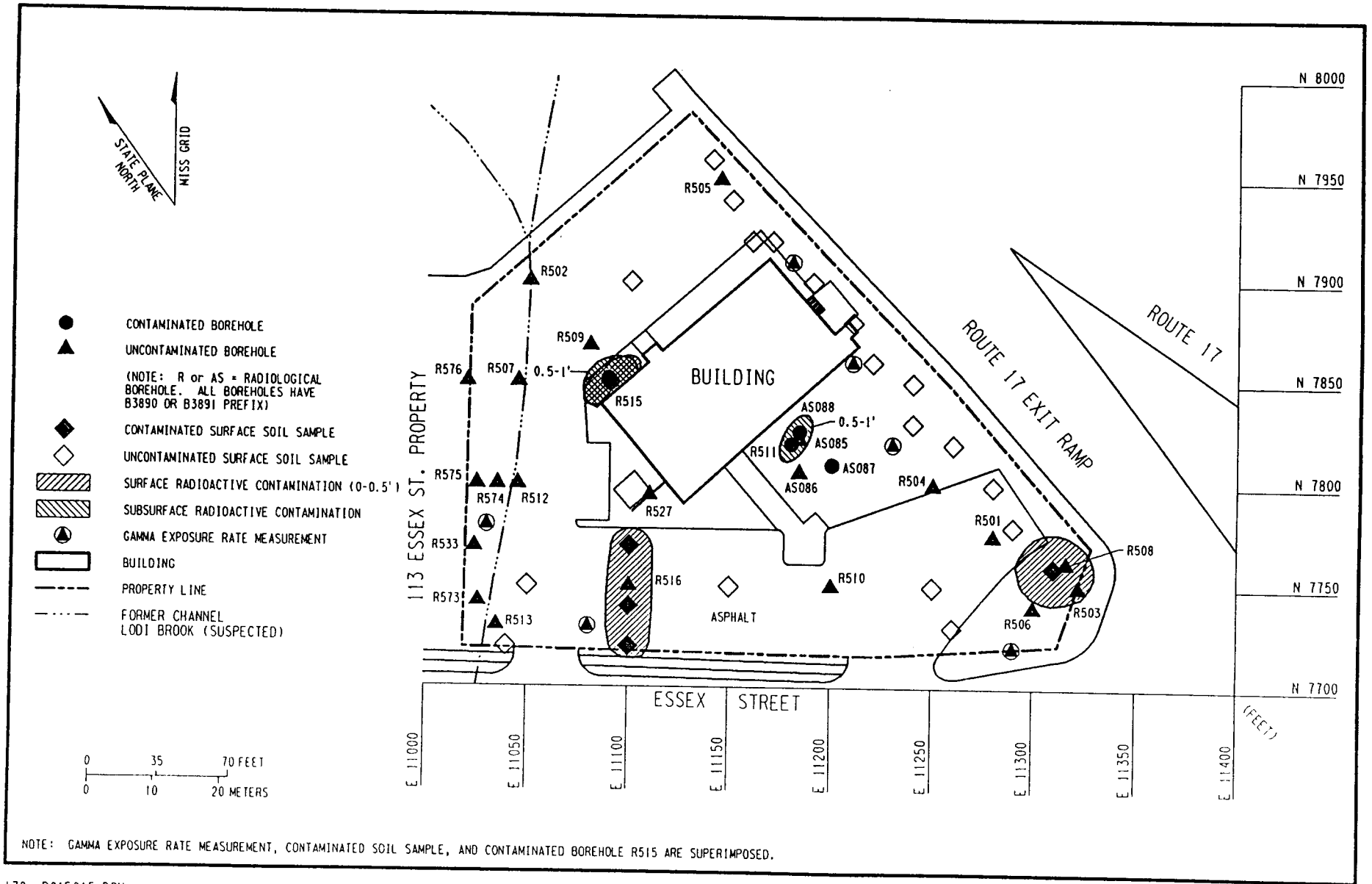
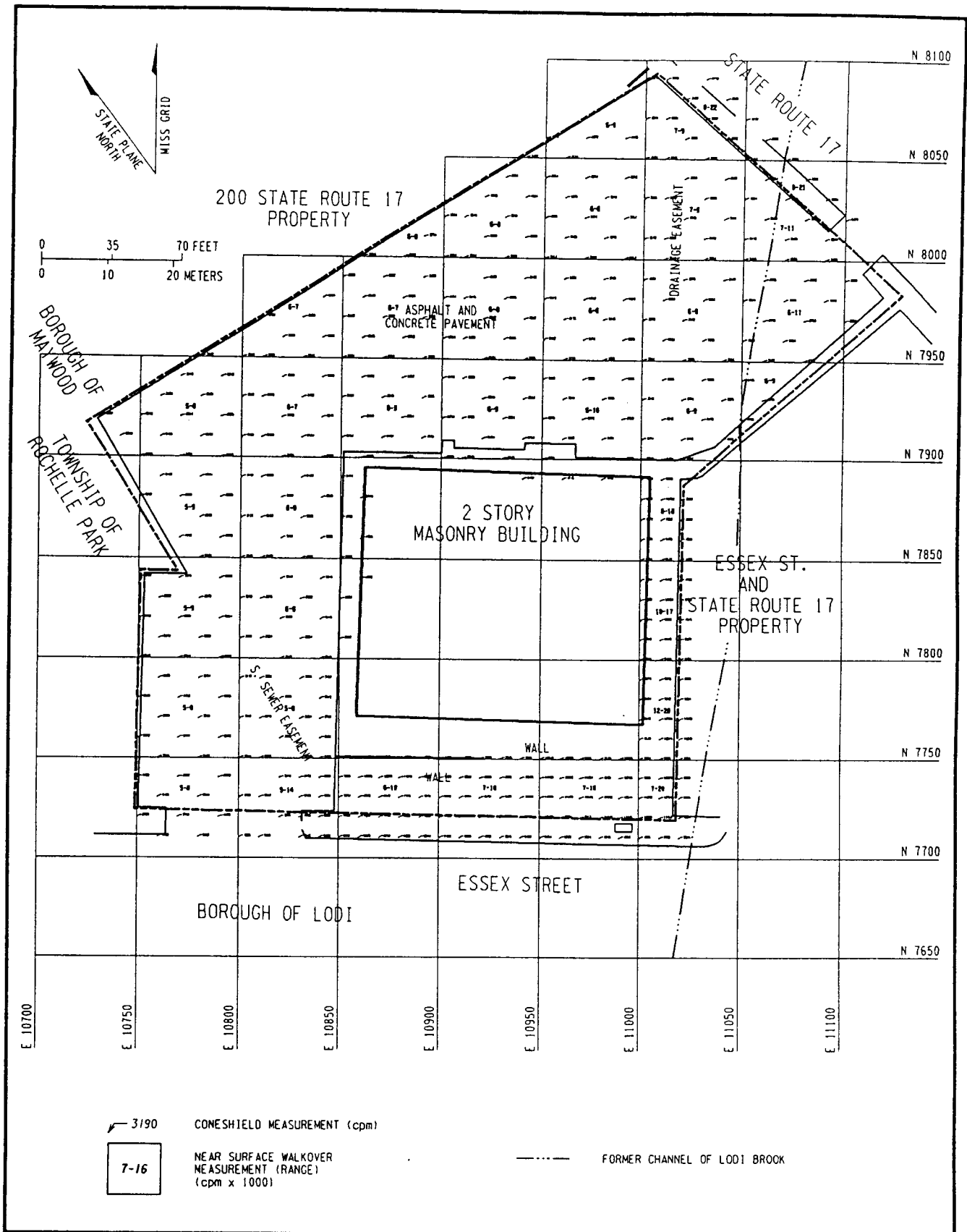
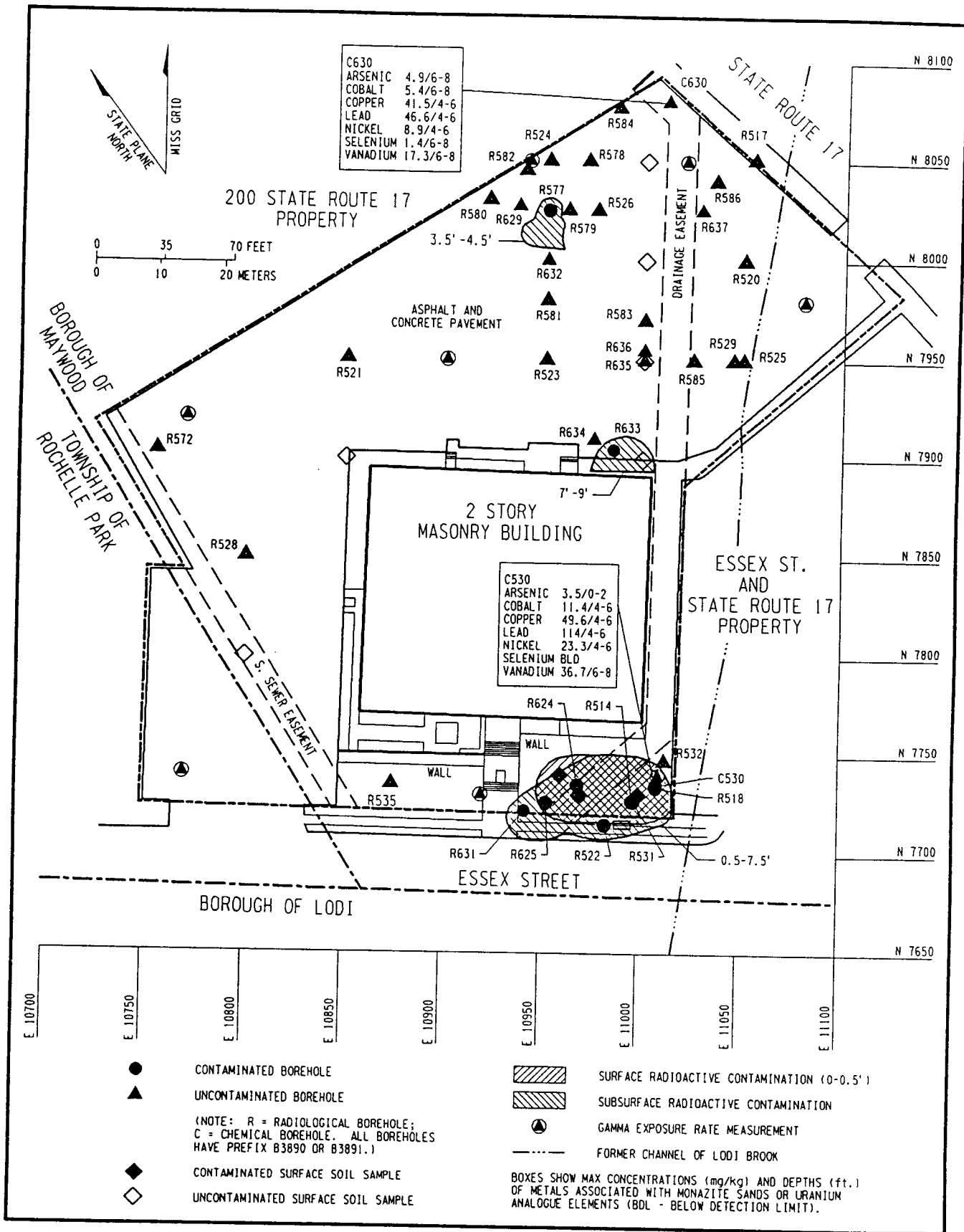


Figure 4-59
Essex Street and State Route 17 Sampling Locations and
Areas of Radioactive Contamination



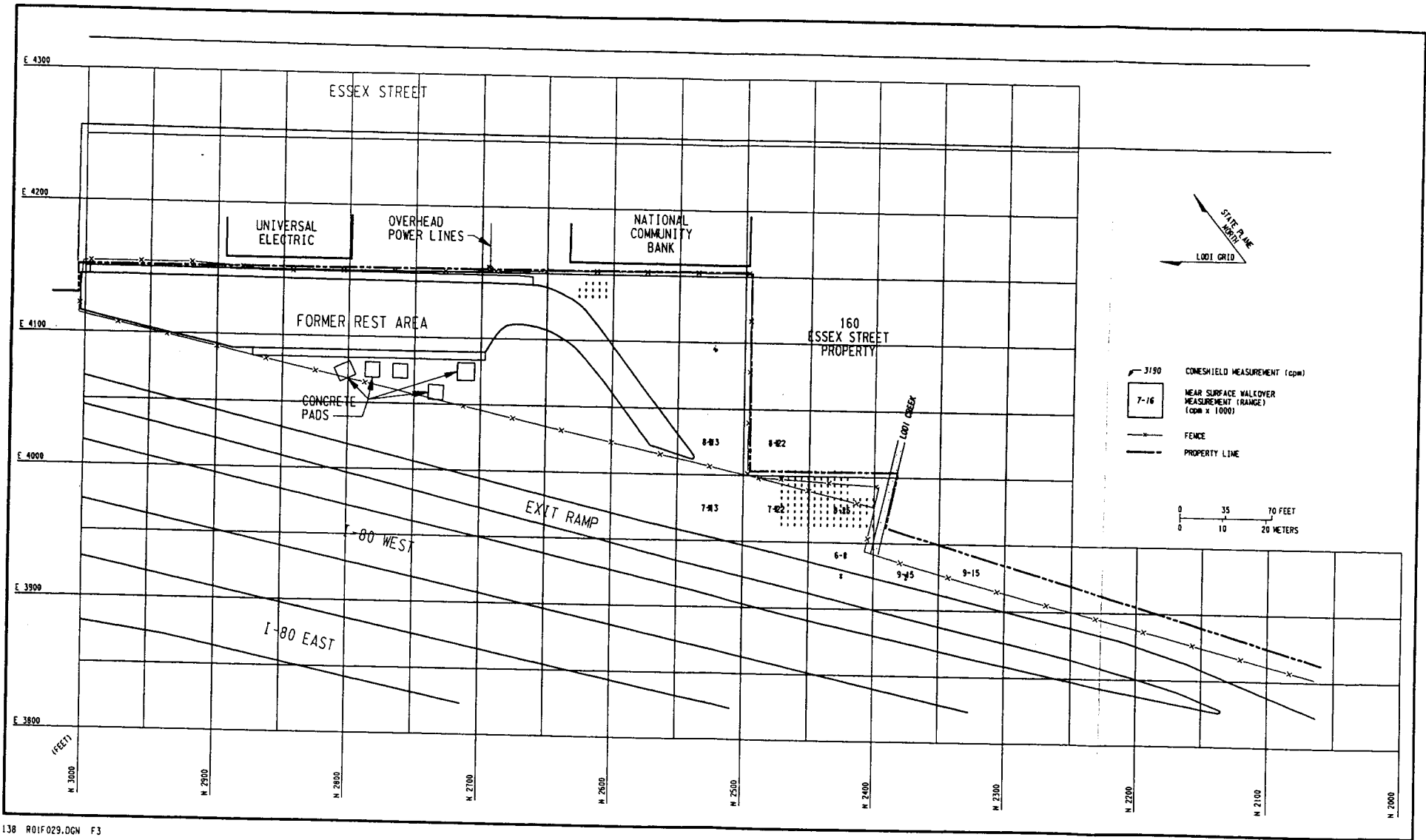
138 R01F016.DGN F3

Figure 4-60
Near-Surface and Coneshield Walkover Measurements
at 113 Essex Street



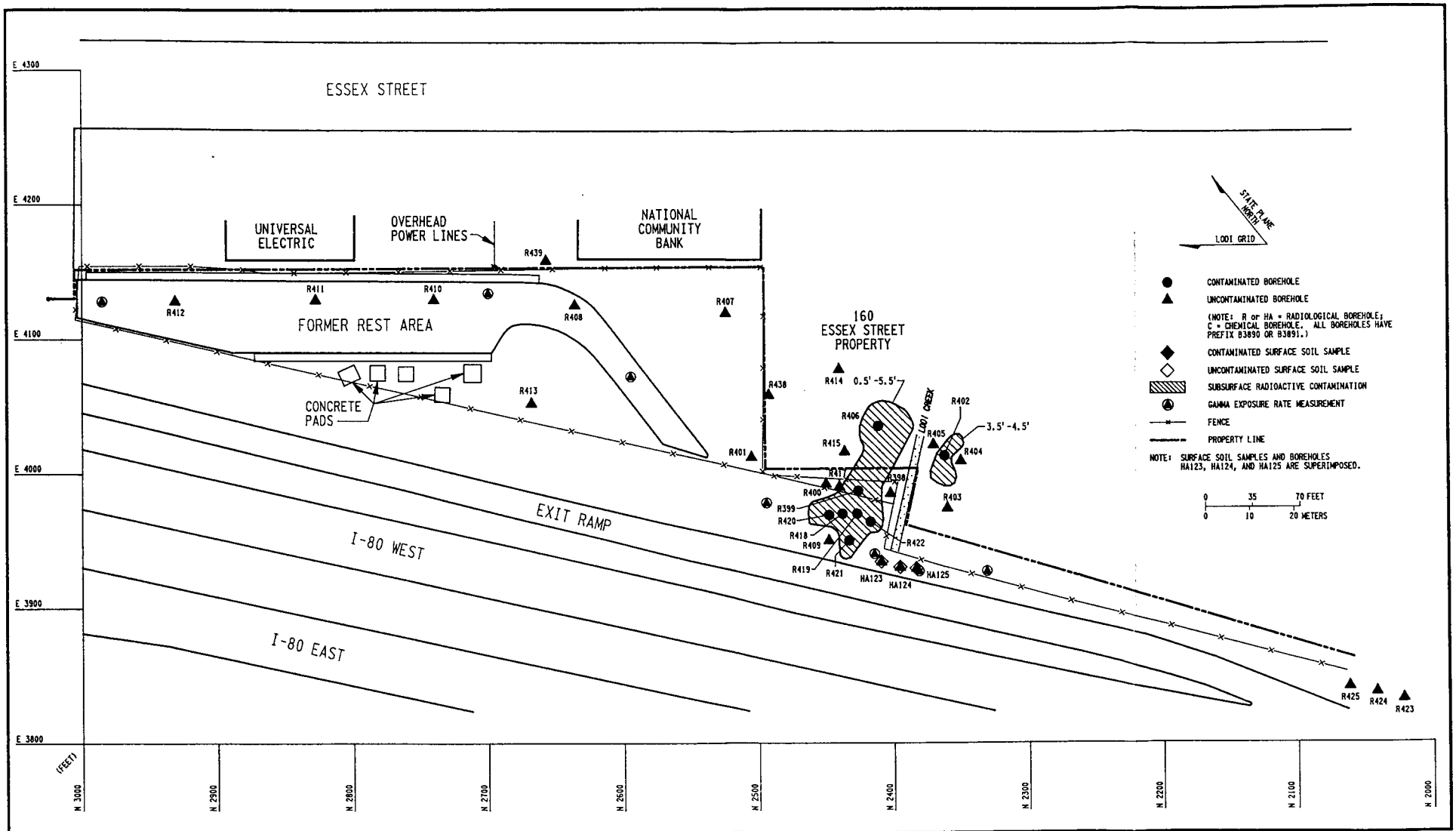
138 ROIF016.DGN

Figure 4-61
113 Essex Street Sampling Locations and Areas of
Radioactive Contamination



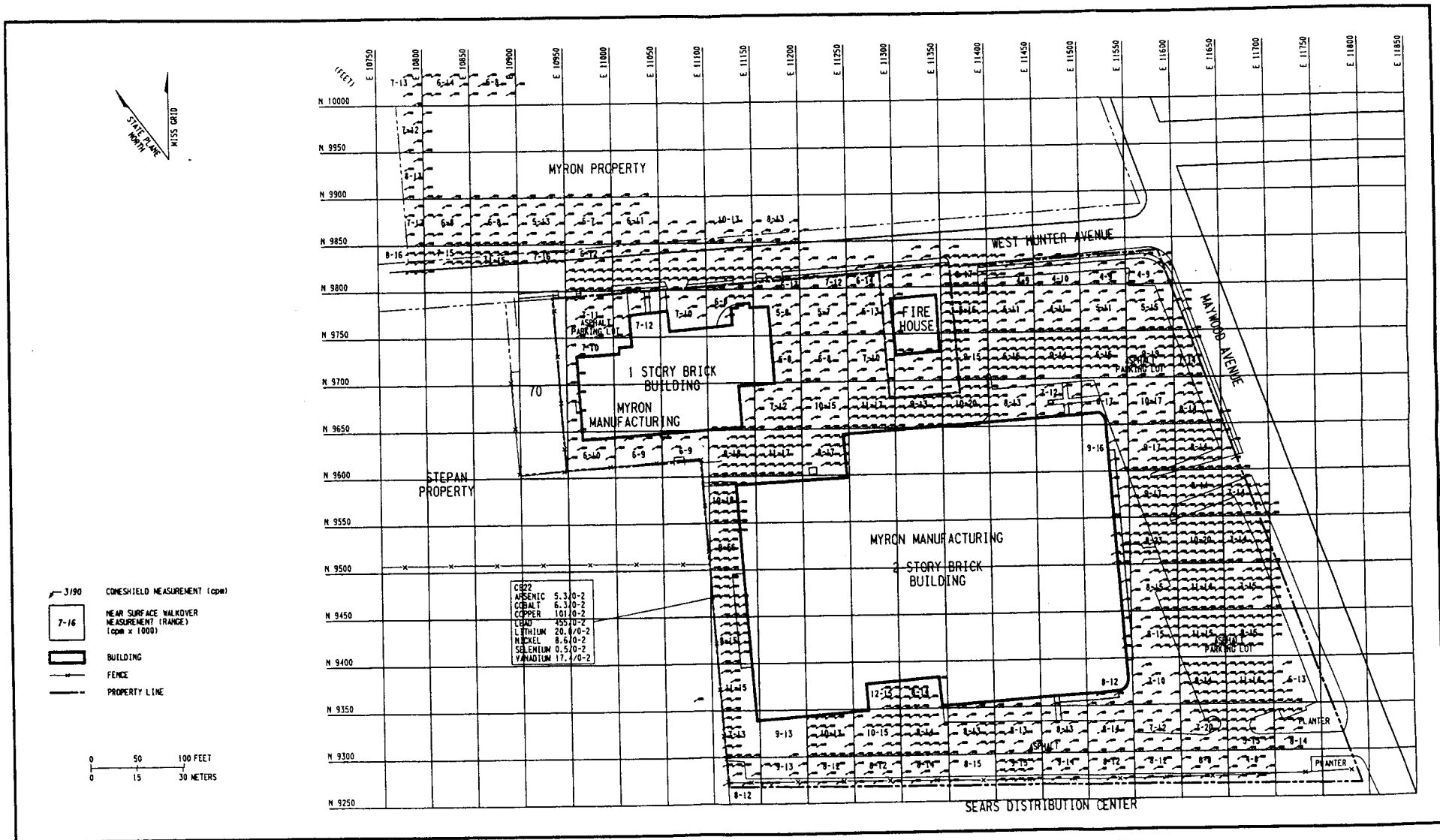
138 R01F029.DGN F3

Figure 4-62
Near-Surface and Coneshield Walkover Measurements at
Interstate 80 (Westbound Right-of-Way)



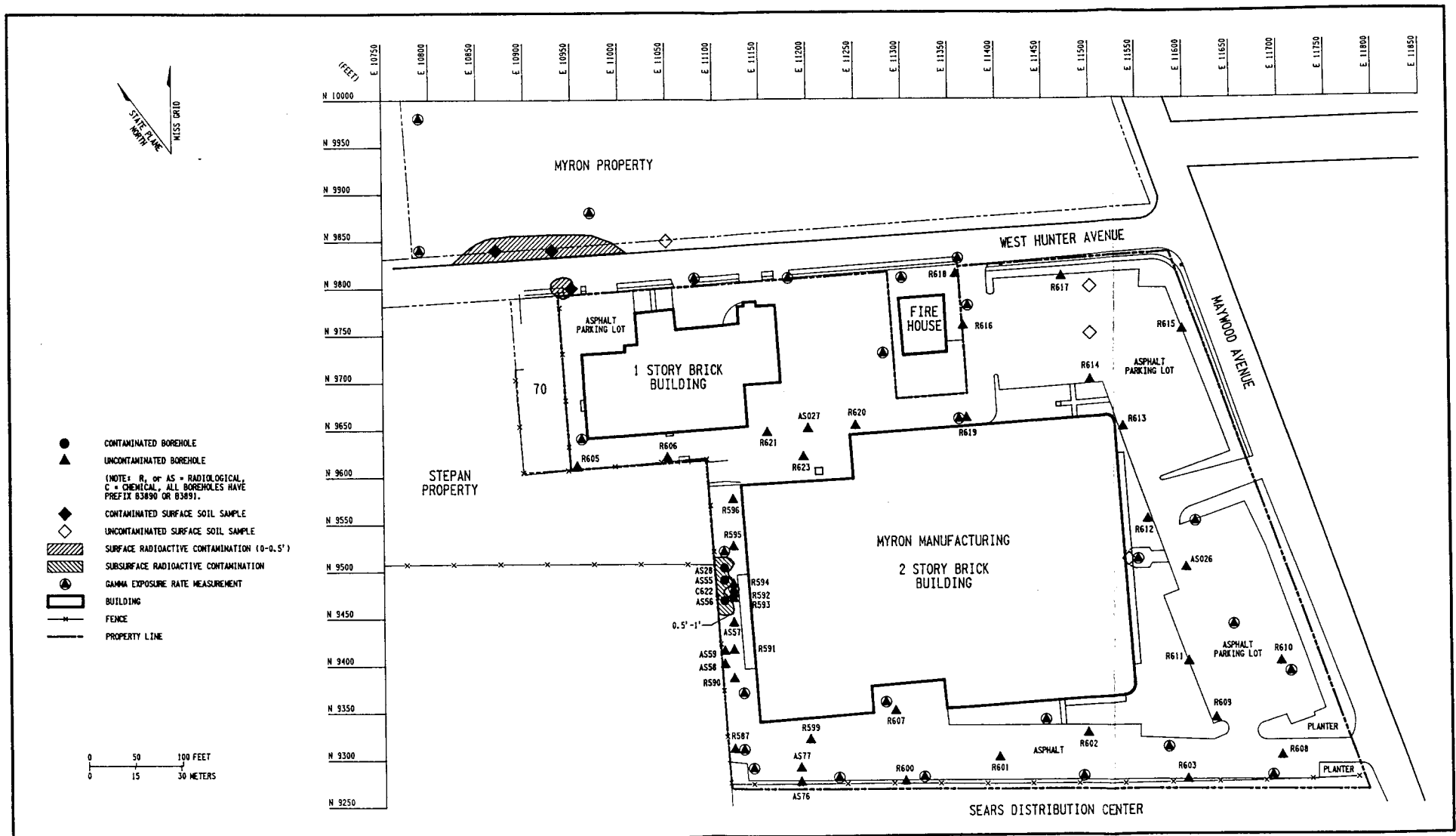
138 ROIF029.DGN F1

Figure 4-63
 Interstate 80 (Westbound Right-of-Way) Sampling Locations and
 Areas of Radioactive Contamination



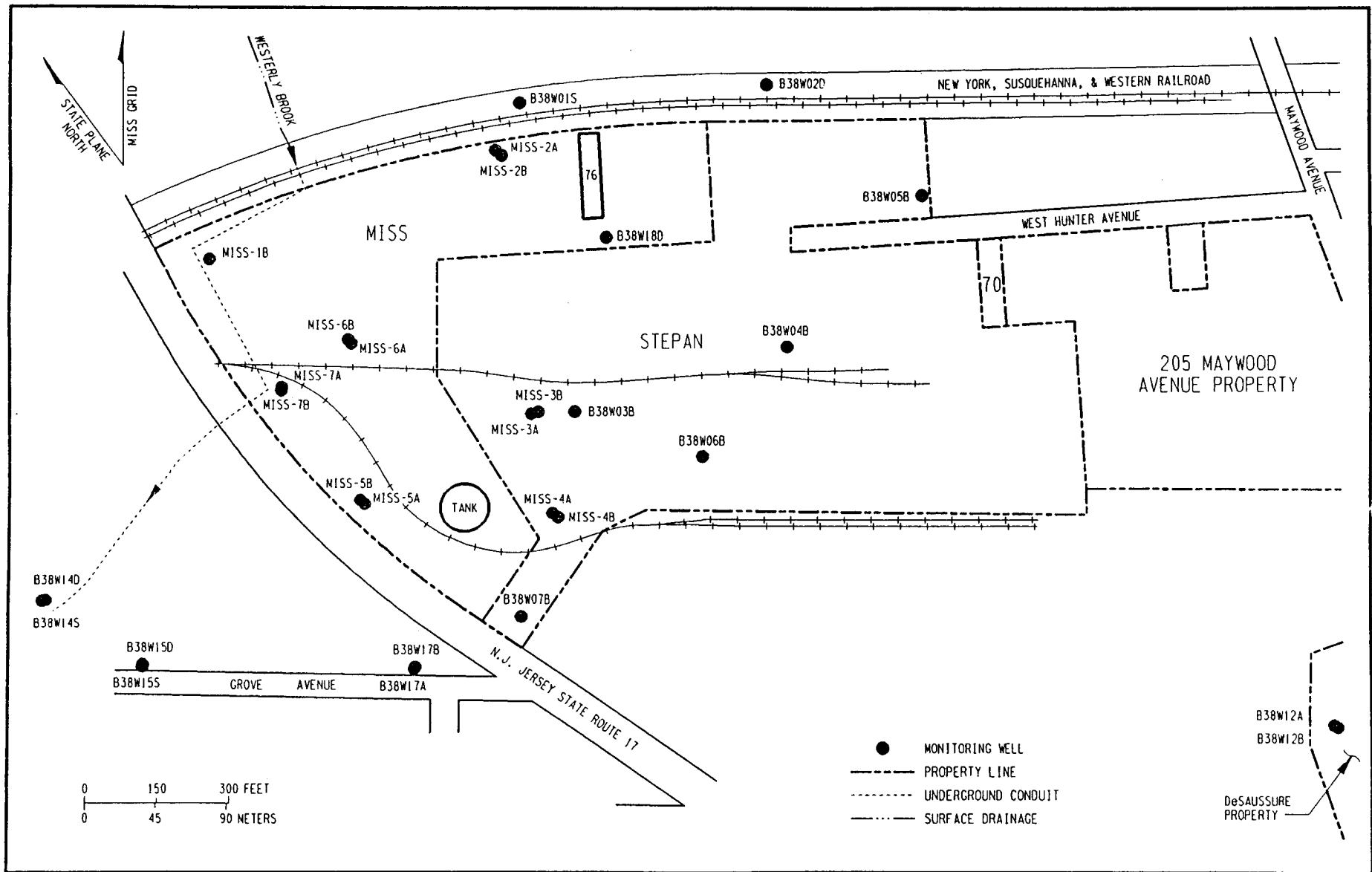
138 R01F030.DGN F2

Figure 4-64
Near-Surface and Coneshield Walkover Measurements at
205 Maywood Avenue



138 R01F030.DGN

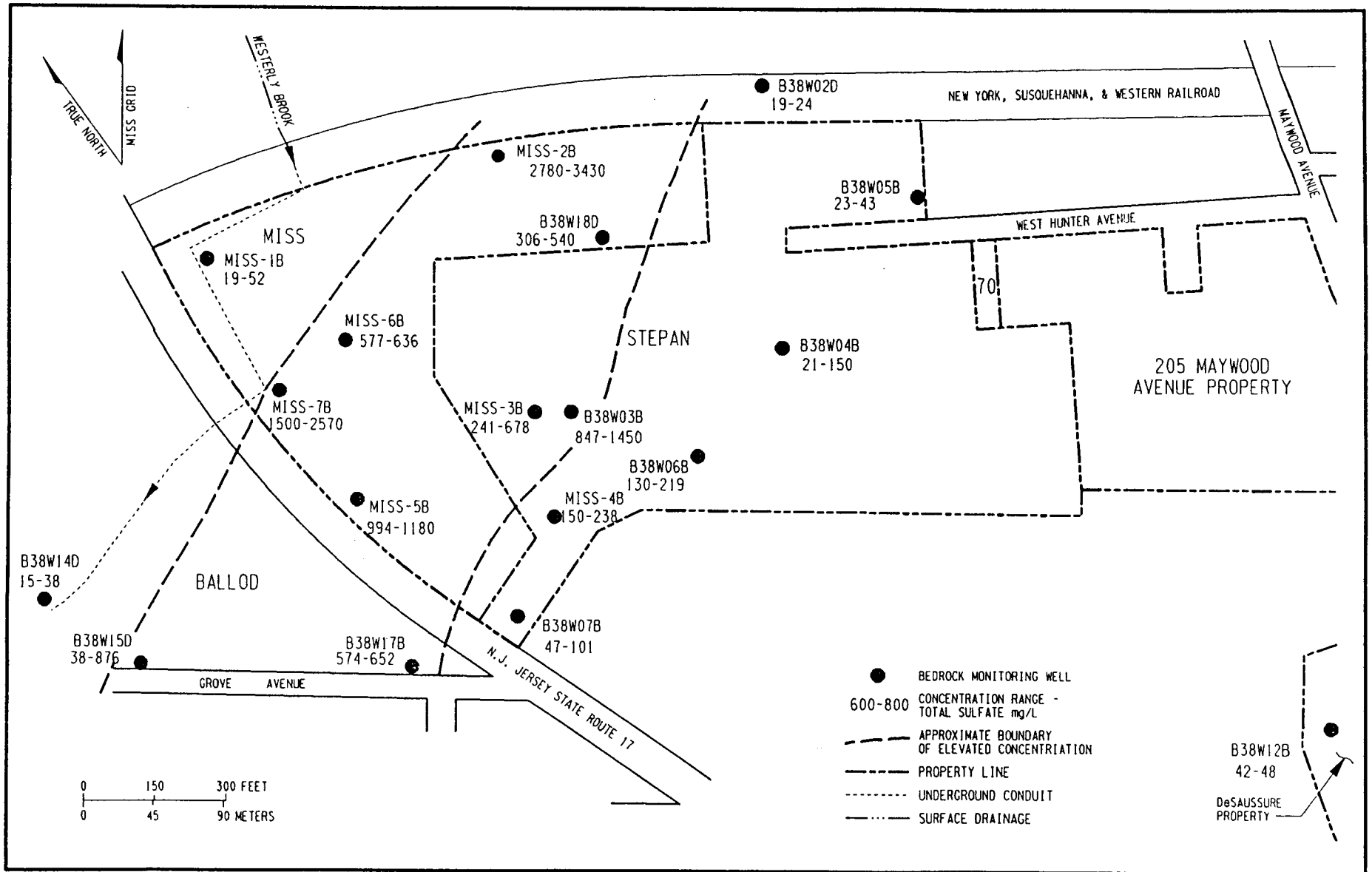
Figure 4-65
205 Maywood Avenue Sampling Locations and Areas
of Radioactive Contamination



138 ROIF031.DGN F1

Figure 4-66
Locations of Groundwater Wells Monitored for Radioactive and
Chemical Contamination in 1990

4-184



138 R01F093.DGN F3

Figure 4-67
Concentration and Distribution of Sulfate in Groundwater

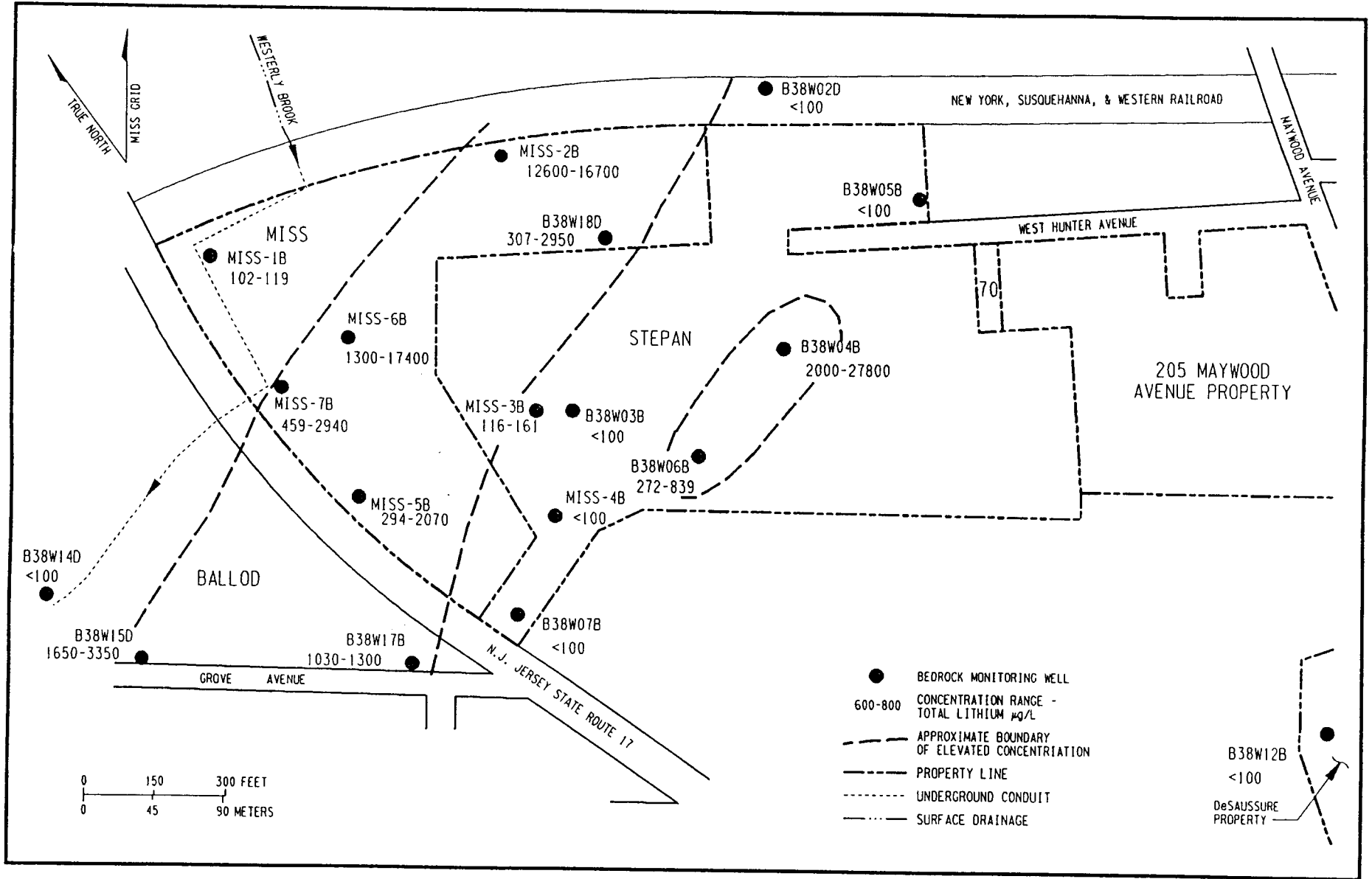
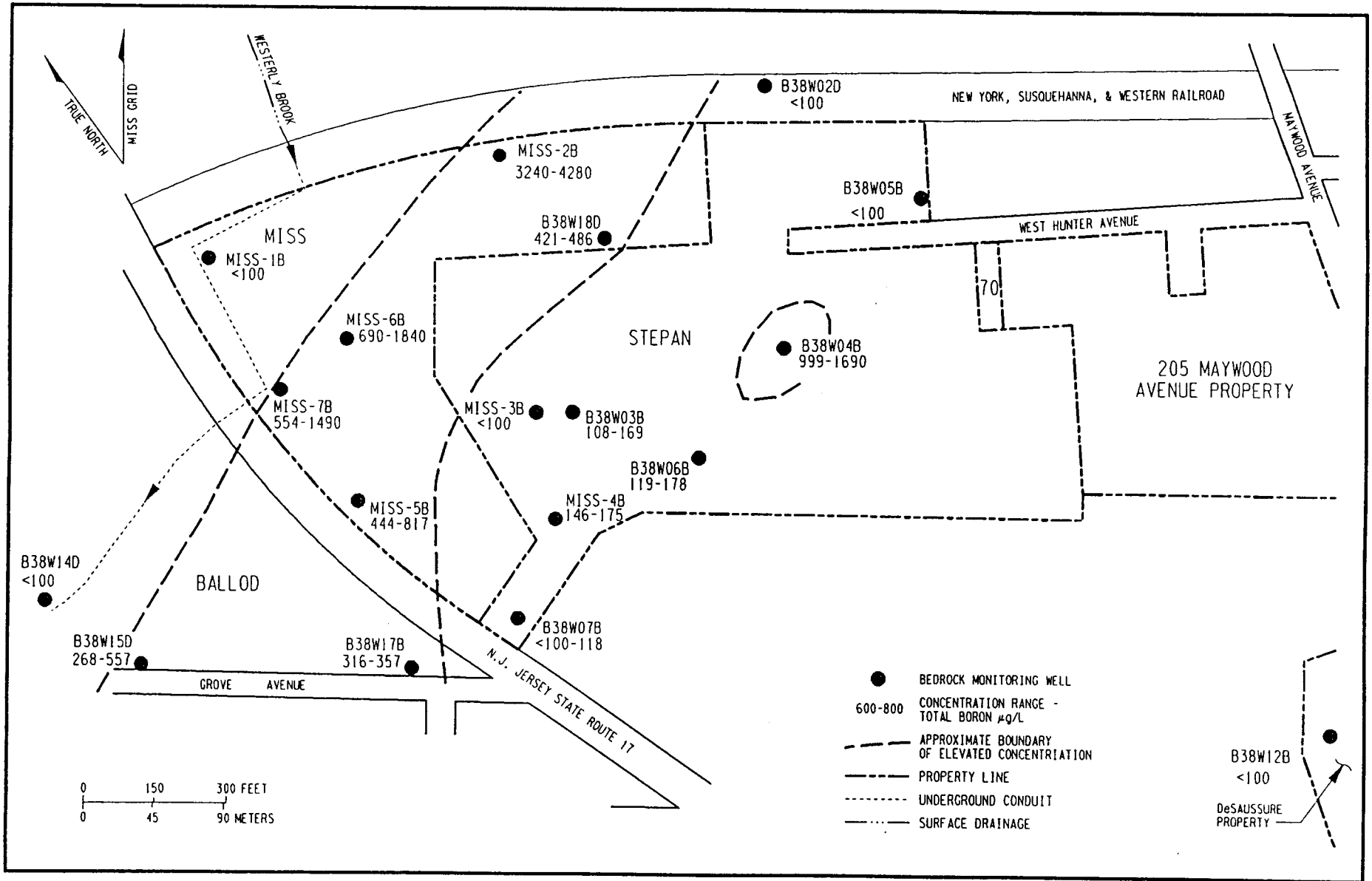


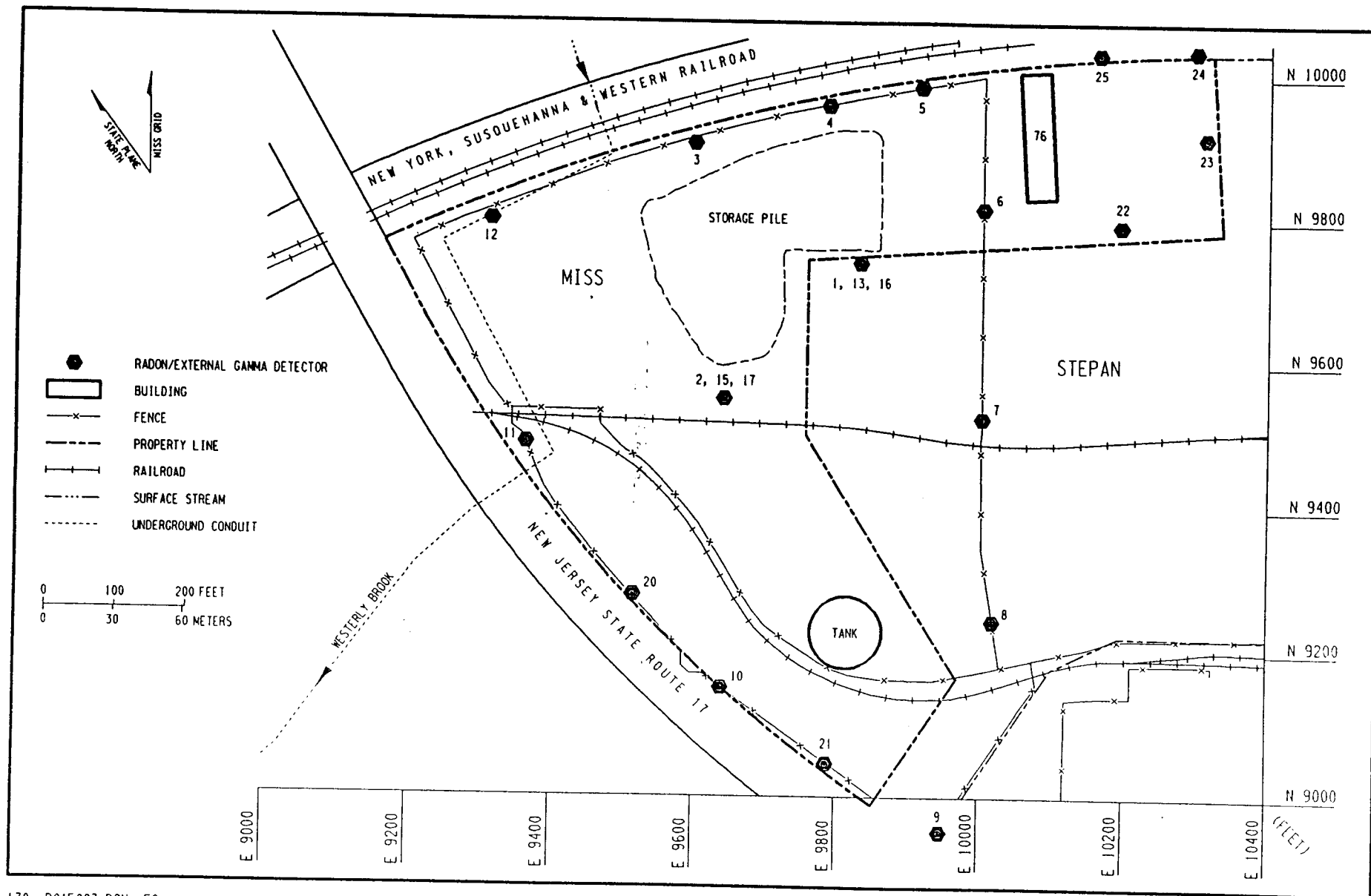
Figure 4-68
Concentration and Distribution of Lithium in Groundwater



138 R01F093.DGN F1

Figure 4-69
 Concentration and Distribution of Boron in Groundwater

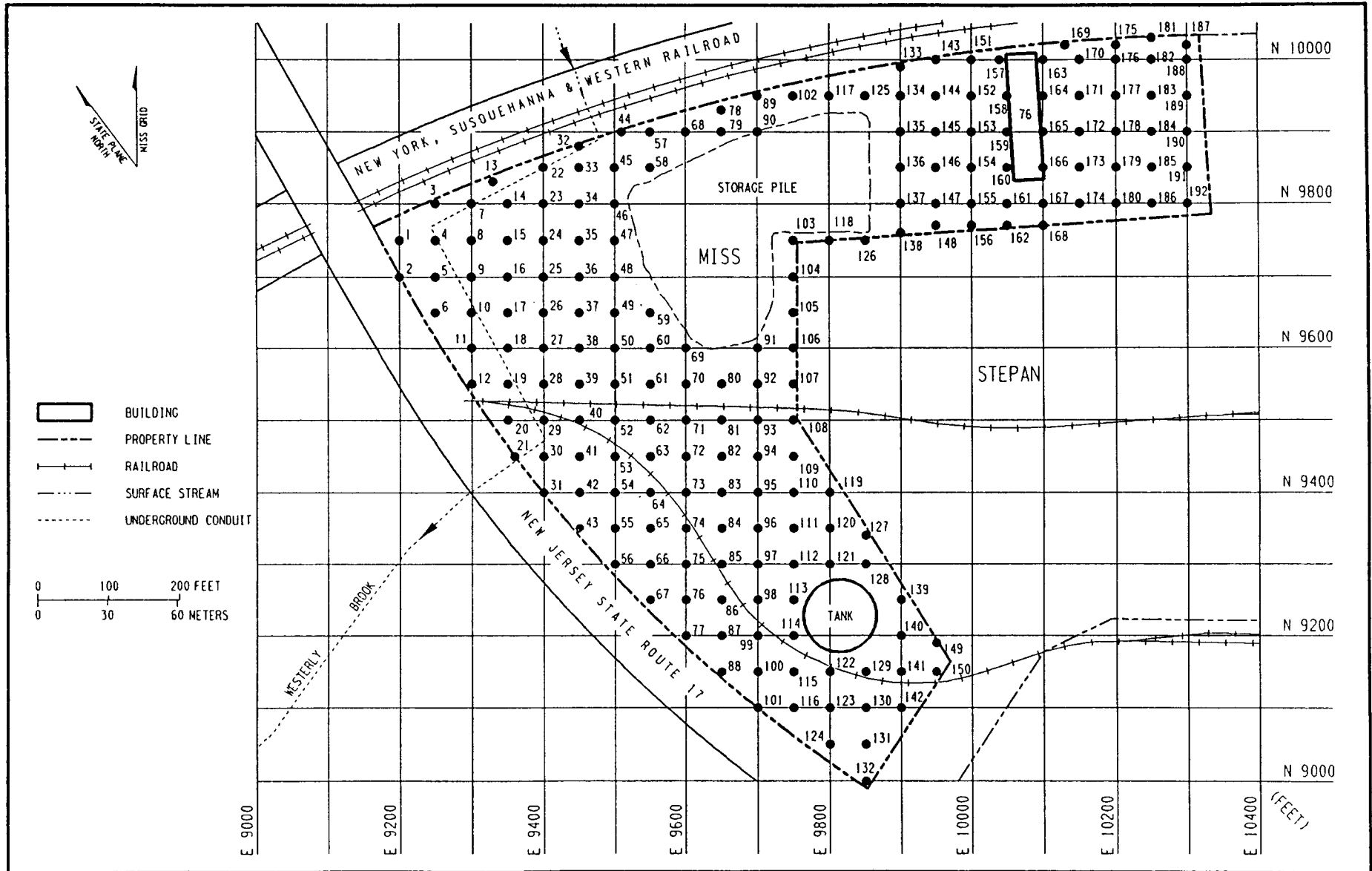
4-187



138 R01F003.DGN F2

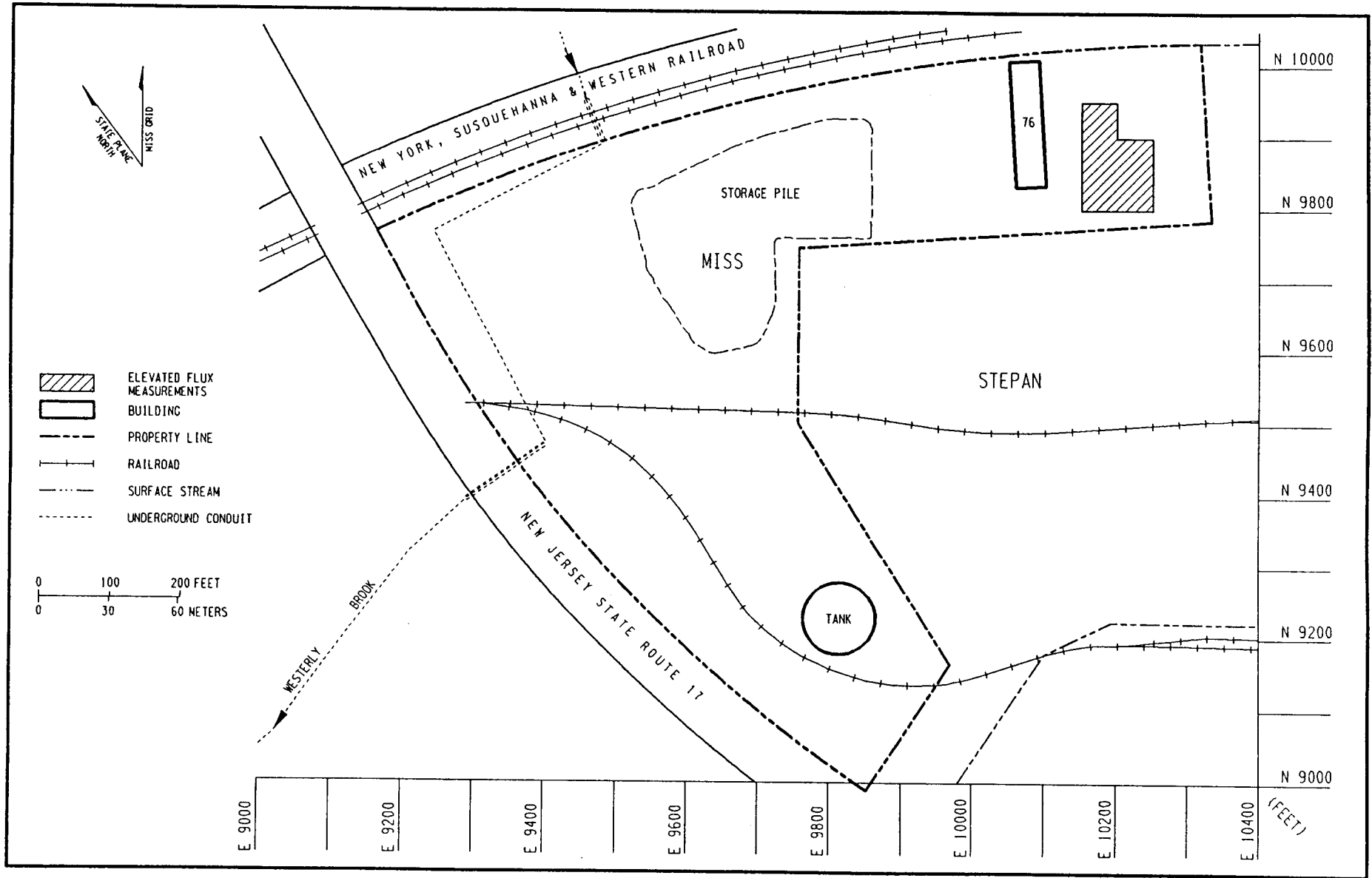
Figure 4-70
Onsite and Fenceline Radon and External Gamma Radiation
Monitoring Locations at MISS

4-188



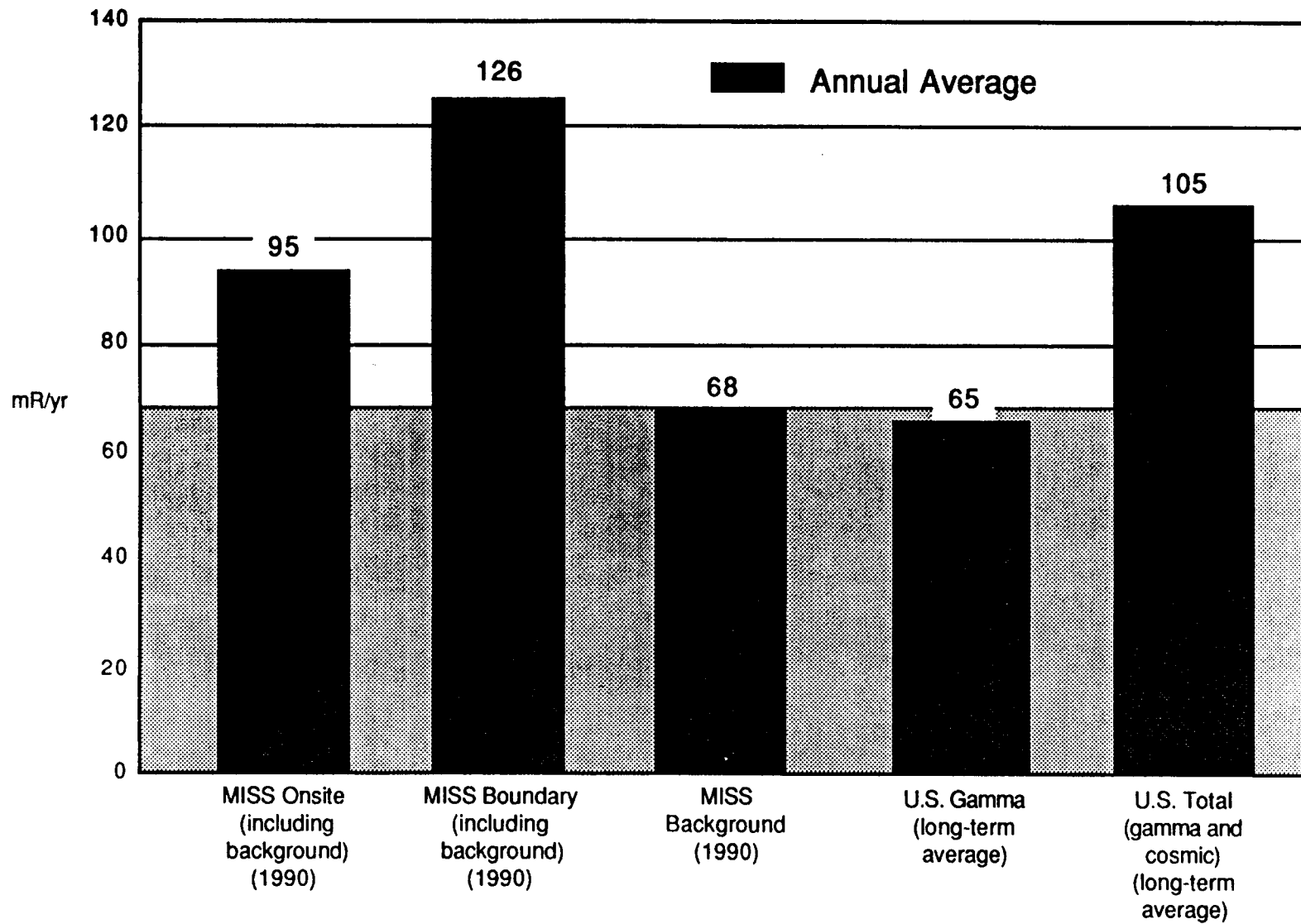
138 R01F025.DGN F1

Figure 4-71
Locations of Radon Flux Measurement Stations at MISS



138 ROIF025.DGN F2

Figure 4-72
Area of Elevated Radon Flux Measurements at MISS



The DOE guideline for external gamma exposure is 100 mrem/yr above background level (DOE 1990). Note: 1 mrem is approximately equivalent to 1 mR.

Source: Martin Marietta Energy Systems, Inc. 1989. *Portsmouth Gaseous Diffusion Plant Site Environmental Report for 1988*, ES/ESH-8/V4, Oak Ridge, Tenn.

Figure 4-73
External Gamma Radiation Exposure Rates

TABLES FOR SECTION 4.0

Table 4-1
Analytical Results for Background
Radionuclide Concentrations in Soil
(pCi/g)

Location	U-238	Ra-226	Th-232
Foschini Park	<3.5	<0.8	<1.1
Rochelle Park	<2.4	<0.5	<0.9
Borough Park-Maywood	<2.9	<0.7	<0.9
Average	<2.9	<0.7	<1.0

Table 4-2
Results of Isotopic Analysis of Soil

Page 1 of 3

(pCi/g)

Sample Identification Number	Ra-226	Ra-228	U-238	U-235	U-234	Th-232	Th-230	Th-228
138MW0128	<0.44	4.94 ± 0.88	<5.67	<0.17	<38.41	8.77 ± 1.39	<1.88	11.42 ± 1.59
138MW0145	0.71 ± 0.44	5.2 ± 1.2	<6.83	<0.24	<43.28	8.00 ± 1.33	<2.98	9.98 ± 1.48
138MW0153	4.23 ± 0.90	55.9 ± 2.8	<14.18	<0.44	<91.40	39.12 ± 2.94	<5.12	39.06 ± 2.93
138MW0422	<0.62	5.1 ± 1.2	<6.26	<0.24	<39.16	5.85 ± 1.14	<2.26	4.47 ± 0.99
138MW0451	3.09 ± 0.67	36.5 ± 2.2	<11.90	<0.34	<75.19	37.51 ± 2.88	<6.95	34.26 ± 2.75
138MW0470	1.66 ± 0.51	12.6 ± 1.3	<7.12	0.32 ± 0.30	<46.61	17.88 ± 1.99	<2.70	19.87 ± 2.09
138MW0807	1.00 ± 0.42	6.4 ± 1.2	<5.61	<0.19	<38.27	16.43 ± 1.90	<3.03	15.17 ± 1.83
138MW0829	2.99 ± 0.75	36.1 ± 2.5	<11.60	0.41 ± 0.35	<65	36.42 ± 2.83	<9.43	39.50 ± 3.23
138MW0860	1.50 ± 0.51	19.4 ± 2.1	<8.56	<0.27	<57.31	27.19 ± 2.45	<7.06	34.42 ± 2.76
138MW1067	1.67 ± 0.56	14.2 ± 1.5	<7.76	0.36 ± 0.27	<48.46	14.29 ± 1.78	<6.07	11.91 ± 1.62
138MW1086	1.69 ± 0.42	7.1 ± 1.1	<6.44	<0.26	<40.27	11.59 ± 1.60	<3.42	8.55 ± 1.37
138MW1112	1.61 ± 0.48	6.2 ± 1.5	<6.82	<0.22	<45.20	39.13 ± 2.94	<6.94	30.26 ± 2.58
138MW1130	2.31 ± 0.52	3.67 ± 0.95	<5.7	<0.17	<37.64	40.17 ± 2.98	<8.60	49.27 ± 3.30
138MW1328	<0.85	24.99 ± 2.50	<12.51	<0.41	<80.56	42.4 ± 3.06	<7.23	48.52 ± 3.27
138MW1330	<1.07	65.56 ± 4.06	<19.86	<0.58	<122.61	95.72 ± 4.60	<10.21	59.29 ± 3.62
138MW1355	5.45 ± 1.20	99.59 ± 5.16	<23.89	<0.73	<150.87	89.65 ± 4.45	<9.99	81.98 ± 4.25
138ST0309	5.90 ± 0.69	39.3 ± 2.1	8.44 ± 0.94	0.275 ± 0.076	8.00 ± 0.90	2.87 ± 0.80	<0.72	3.59 ± 0.89
138ST0360	126.2 ± 4.3	72.2 ± 10	106 ± 11	4.09 ± 0.48	109 ± 11	100.58 ± 4.71	<27	243.61 ± 7.33
138ST0369	1.94 ± 0.51	8.7 ± 1.4	3.07 ± 0.36	0.103 ± 0.040	3.11 ± 0.37	4.53 ± 1.00	<1.99	4.75 ± 1.02
138ST0430	42.6 ± 1.9	244.1 ± 4.8	110 ± 11	5.73 ± 0.67	114 ± 12	29.26 ± 2.54	<9.7	62.93 ± 3.73
138ST0438	37.3 ± 1.5	272.9 ± 4.2	26.2 ± 2.5	1.10 ± 0.16	26.5 ± 2.6	85.07 ± 4.33	<14	104.11 ± 4.79
138ST0456	15.8 ± 4.2	652 ± 10	111 ± 10	5.85 ± 0.59	107.7 ± 9.8	351.31 ± 8.81	<78	462.98 ± 10.11
138ST0713	136.9 ± 5.4	1400 ± 100	119 ± 11	7.90 ± 0.82	120 ± 12	105.77 ± 4.83	<21	165.88 ± 6.05
138ST0808	6.45 ± 0.84	48.5 ± 2.6	6.02 ± 0.68	0.202 ± 0.060	6.0 ± 0.68	70.0 ± 5.48	<8.4	69.83 ± 3.93
138ST0810	1.90 ± 0.34	5.9 ± 1.0	0.89 ± 0.13	0.074 ± 0.030	1.67 ± 0.21	2.98 ± 0.81	<0.88	3.97 ± 0.94

4-194

Table 4-2
(continued)

Page 2 of 3

Sample Identification Number	Re-226	Ra-228	U-238	U-235	U-234	Th-232	Th-230	Th-228
138ST0890	3.60 ± 0.51	17.6 ± 1.5	5.03 ± 0.51	0.262 ± 0.060	4.80 ± 0.48	9.39 ± 1.44	<3.8	10.05 ± 1.49
138ST1013	3.9 ± 1.1	75.3 ± 1.6	28.8 ± 3.0	1.11 ± 0.18	27.3 ± 2.8	35.77 ± 2.81	<9.2	75.58 ± 4.09
138ST1222	<0.57	6.2 ± 1.1	2.90 ± 0.37	0.082 ± 0.038	2.41 ± 0.32	9.44 ± 1.44	<2.1	9.44 ± 1.44
138ST1273	<0.53	3.1 ± 1.2	4.46 ± 0.51	0.08 ± 0.038	2.59 ± 0.32	8.33 ± 1.36	<1.9	12.03 ± 1.63
138ST1317	2.59 ± 0.55	8.7 ± 1.2	2.95 ± 0.37	0.107 ± 0.044	2.89 ± 0.34	20.54 ± 2.13	<3.5	13.58 ± 1.73
138ST1474	3.53 ± 0.68	18.9 ± 1.5	7.31 ± 0.78	0.277 ± 0.070	7.07 ± 0.76	11.98 ± 1.63	<3.7	15.35 ± 1.84
138ST1482	<0.49	4.2 ± 1.1	0.42 ± 0.10	0.082 ± 0.021	1.20 ± 0.20	10.93 ± 1.55	<2.1	8.89 ± 1.40
138ST1955	7.65 ± 0.93	36.2 ± 2.1	10.2 ± 1.0	0.421 ± 0.082	9.88 ± 0.98	51.65 ± 3.38	<6.6	51.54 ± 3.37
138ST2181	80.9 ± 3.3	400 ± 10	26.5 ± 2.7	0.99 ± 0.16	26.5 ± 2.7	526.68 ± 10.78	<43	584.04 ± 11.36
138ST2389	<0.52	<1.2	2.98 ± 0.35	0.063 ± 0.030	1.99 ± 0.25	3.74 ± 0.91	<1.8	7.03 ± 1.24
138ST2518	1.91 ± 0.61	7.2 ± 1.5	3.87 ± 0.43	0.166 ± 0.050	3.82 ± 0.43	16.5 ± 1.91	<2.7	14.6 ± 1.80
138VP017	4.53 ± 0.95	113.7 ± 4.1	19.43	<0.58	<126.00	67.71 ± 5.08	<8.21	65.90 ± 3.81
138VP019	1.32 ± 0.50	12.0 ± 1.6	<7.62	<0.25	<49.00	20.25 ± 2.11	<3.53	20.96 ± 2.15
138VP0204	2.78 ± 0.51	12.6 ± 1.1	3.9 ± 0.4	0.14 ± 0.04	3.8 ± 0.4	31.4 ± 2.6	<4.6	33.7 ± 2.7
138VP0239	0.65 ± 0.34	51.8 ± 0.97	<5.74	<1.97	<3.35	5.35 ± 1.09	<1.71	7.22 ± 1.26
138VP0281	1.30 ± 0.55	9.01 ± 1.24	<4.05	<0.15	<24.77	17.66 ± 1.97	<2.81	13.85 ± 1.75
138VP0290	42.2 ± 1.7	230 ± 5	27.0 ± 2.6	1.0 ± 0.1	27.1 ± 2.7	126.36 ± 5.28	<11.87	156.39 ± 5.88
138VP0333	3.66 ± 0.75	72.3 ± 3.0	6.7 ± 0.7	0.23 ± 0.06	7.0 ± 0.8	56.7 ± 3.5	<7.2	57.9 ± 3.6
138VP0467	1.63 ± 0.42	6.9 ± 1.0	4.6 ± 0.6	0.15 ± 0.05	4.7 ± 0.5	9.3 ± 1.4	<1.87	10.4 ± 1.5
138VP0523	11.7 ± 1.2	29.8 ± 2.5	47.3 ± 5.6	1.85 ± 0.30	48.8 ± 5.7	42.43 ± 3.05	<8.36	38.08 ± 2.90
138VP0525	3.18 ± 0.68	14.6 ± 1.6	13.2 ± 1.5	0.49 ± 0.11	11.8 ± 1.3	18.59 ± 2.03	<3.59	19.15 ± 2.06
138VP0906	<0.54	12.1 ± 1.4	10.0 ± 1.6	0.33 ± 0.13	10.2 ± 1.7	17.54 ± 1.97	<2.43	14.06 ± 1.55
138VP0961	0.70 ± 0.33	4.65 ± 0.88	1.79 ± 0.50	0.17 ± 0.12	2.78 ± 0.70	5.93 ± 1.14	1.92 ± 0.65	5.77 ± 1.13
138VP1000	<0.74	18.6 ± 2.0	3.90 ± 0.86	<0.073	3.57 ± 0.80	13.02 ± 1.69	<2.75	15.27 ± 1.83

Table 4-2
(continued)

Page 3 of 3

Sample Identification Number	Ra-226	Ra-228	U-238	U-235	U-234	Th-232	Th-230	Th-228
138VP1060	<0.45	1.24 ± 0.60	1.00 ± 0.28	<0.022	1.52 ± 0.37	1.05 ± 0.48	<0.5	1.54 ± 0.58
138VP1085	<0.86	25.1 ± 2.3	14.8 ± 7.4	1.4 ± 0.4	<60.6	24.42 ± 2.32	<5.00	28.71 ± 2.51
138VP1101	<0.72	12.8 ± 1.8	9.7 ± 6.8	0.4 ± 0.2	<45.2	19.44 ± 2.07	<3.08	18.83 ± 2.04
138VP1143	<0.71	15.8 ± 2.0	12.6 ± 6.0	0.7 ± 0.3	<48.6	27.13 ± 2.44	<5.11	23.12 ± 2.25
138VP1151	<0.50	4.5 ± 1.2	1.12 ± 0.21	0.05 ± 0.036	0.90 ± 0.18	3.46 ± 0.87	<0.9	5.39 ± 1.09

Table 4-3
Representative Background Metal and Rare Earth
Concentrations in Soil, Maywood Site^{a,b}

Page 1 of 2

Constituent	Minimum Concentration (mg/kg)		Maximum Concentration (mg/kg)		Mean Concentration (mg/kg)
Silver, Total	2.26	UJ	5.1	J	3.6
Aluminum, Total	4690	J	10500	J	7,448
Arsenic, Total	1.5	B	7.1		3.3
Boron, Total	22.6	U	24.6	U	23.6
Barium, Total	31.5	B	56.2	U	44.6
Beryllium, Total	0.41	B	0.69	B	0.56
Calcium, Total	888		1510		1,210
Cadmium, Total	0.68	U	0.74	U	0.71
Cerium, Total	45.3		49.5		47.3
Cobalt, Total	3.3	B	9.9	B	7.6
Chromium, Total	5.3		18.8		12.8
Copper, Total	8.1		28.2		17.9
Dysprosium, Total	45.3	U	49.1	U	47.2
Erbium, Total	206		785		506
Europium, Total	45.3	U	49.1	U	47.2
Iron, Total	5590	J	21200	J	14,448
Gadolinium, Total	45.3	U	49.1	U	47.2
Holmium, Total	45.3	U	49.1	U	47.2
Potassium, Total	288	B	726	B	405
Lanthanum, Total	45.3	U	49.1	U	47.2
Lithium	22.6	U	24.6	U	23.6
Lutetium, Total	45.3	U	49.1	U	47.2
Magnesium, Total	724	B	2610	J	1,841
Manganese, Total	237	J	725	J	466
Molybdenum, Total	22.6	U	24.6	U	23.6
Sodium, Total	46	B	75.8	B	62.2
Neodymium, Total	45.3	U	49.1	U	47.2
Nickel, Total	5.6	B	10.2		8.8
Lead, Total	10.7	U	89.8	J	39
Praseodymium, Total	45.3	U	49.1	UJ	4.7
Antimony, Total	4.53	U	4.91	UJ	4.7
Selenium, Total	0.41	UJ	0.49	UJ	0.45
Samarium, Total	45.3	U	49.1	U	47.2
Terbium, Total	56.6	U	61.4	U	59
Tellurium, Total	45.3	U	49.1	U	47.2
Thallium, Total	0.41		0.49	U	0.45
Thulium, Total	201		750		482.8
Vanadium, Total	7.2	B	31.3		20.2
Yttrium, Total	45.3	U	49.1	U	47.2
Ytterbium, Total	45.3	U	49.1	U	47.2

Table 4-3
(continued)

Page 2 of 2

Constituent	Minimum Concentration (mg/kg)	Maximum Concentration (mg/kg)	Mean Concentration (mg/kg)
Zinc, Total	25.7	102 J	50.5
Zirconium, Total	45.3 U	49.1 U	47.2

^aRefer to Figure 4-1 for background sampling locations (Borough Park).

^bComplete background data for soil are presented in Appendix K.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

J - Analyte present; reported as an estimated value.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

UJ - Associated value was analyzed for and was not detected but must be estimated due to quality control considerations.

Note: Where a constituent was identified as nondetectable (U), and therefore the minimum detection limit reported, this value was factored into the determination of the mean.

Table 4-4
Reference Baseline VOC Concentrations
in Soil, Maywood Site^{a,b}

Page 1 of 2

Constituent	Minimum Concentration (µg/kg)	Maximum Concentration (µg/kg)	Mean Concentration (µg/kg)
Chloromethane	11 U	14 U	12.3
Bromomethane	11 U	14 U	12.3
Vinyl chloride	11 U	14 U	12.3
Chloroethane	11 U	14 U	12.3
Methylene chloride	23 U	61	40.0
Acetone	6 J	42 U	25.3
Carbon disulfide	6 U	7 U	6.3
1,1-Dichloroethene	6 U	7 U	6.3
1,1-Dichloroethane	6 U	7 U	6.3
Chloroform	6 U	7 U	6.3
1,2-Dichloroethane	6 U	7 U	6.3
2-Butanone	12 U	12 U	12.0
1,1,1-Trichloroethane	6 U	7 U	6.3
Carbon tetrachloride	6 U	7 U	6.3
Vinyl acetate	11 U	14 UJ	12.3
Bromodichloromethane	6 U	7 UJ	6.3
1,2-Dichloropropane	6 U	7 UJ	6.3
cis-1,3-Dichloropropene	6 U	7 UJ	6.3
Trichloroethene	6 U	7 UJ	6.3
Dibromochloromethane	6 U	7 UJ	6.3
1,1,2-Trichloroethane	6 U	7 UJ	6.3
Benzene	6 U	7 UJ	6.3
2-Chloroethylvinylether	11 U	14 UJ	12.3
Bromoform	6 U	7 UJ	6.3
4-Methyl-2-pentanone	11 U	14 UJ	12.3
2-Hexanone	11 U	14 UJ	12.3
Tetrachloroethene	2 J	7 UJ	5.3
Toluene	2 J	8	4.8
Chlorobenzene	6 J	7 UJ	6.3
Ethylbenzene	6 U	7 UJ	6.3
Styrene	6 U	7 UJ	6.3
Xylene (total)	6 U	7 UJ	6.3
Acrolein	11 U	14 U	12.3
Acrylonitrile	11 U	14 U	12.3

^aRefer to Figure 4-1 for background/baseline sampling locations (Borough Park).

^bComplete background/baseline data for soil are presented in Appendix K.

Table 4-4
(continued)

Page 2 of 2

U -The analyte was not detected. The minimum detection limit for the sample is reported.

J -Analyte present; reported as an estimated value.

B -Reported value was less than the CRDL but greater than or equal to the IDL.

UJ -Associated value was analyzed for and was not detected but must be estimated due to quality control considerations.

Table 4-5
Representative Baseline BNAE Concentrations
in Soil, Maywood Site^a

Page 1 of 2

Constituent	Minimum Concentration (µg/kg)	Maximum Concentration (µg/kg)	Mean Concentration ^b (µg/kg)
Phenol	390 U	2200 U	845
Bis(2-chloroethyl)ether	390 U	2200 U	845
2-Chlorophenol	390 U	2200 U	845
1,3-Dichlorobenzene	390 U	2200 U	845
1,4-Dichlorobenzene	390 U	2200 U	845
Benzyl alcohol	390 U	2200 U	845
1,2-Dichlorobenzene	390 U	2200 U	845
2-Methylphenol	390 U	2200 U	845
Bis(2-chloroisopropyl)ether	390 U	2200 U	845
4-Methylphenol	390 U	2200 U	845
N-Nitroso-Di-n-propylamine	390 U	2200 U	845
Hexachloroethane	390 U	2200 U	845
Nitrobenzene	390 U	2200 U	845
Isophorone	390 U	2200 U	845
2-Nitrophenol	390 U	2200 U	845
2,4-Dimethylphenol	390 U	2200 U	845
Benzoic acid	1900 UJ	11000 UJ	4,225
Bis(2-chloroethoxy)methane	390 U	2200 U	845
2,4-Dichlorophenol	390 U	2200 U	845
1,2,4-Trichlorobenzene	390 U	2200 U	845
Naphthalene	390 U	2200 U	845
4-Chloroaniline	390 U	2200 U	845
Hexachlorobutadiene	390 U	2200 U	845
4-Chloro-3-methylphenol	390 U	2200 U	845
2-Methylnaphthalene	390 U	2200 U	845
Hexachlorocyclopentadiene	390 U	2200 U	845
2,4,6-Trichlorophenol	390 U	2200 U	845
2,4,5-Trichlorophenol	1900 U	11000 U	4,225
2-Chloronaphthalene	390 U	2200 U	845
2-Nitroaniline	1900 U	11000 U	4,225
Dimethylphthalate	390 U	2200 U	845
Acenaphthylene	390 U	2200 U	845
2,6-Dinitrotoluene	390 U	2200 U	845
3-Nitroaniline	1900 U	11000 U	4,225
Acenaphthene	390 U	2200 U	845
2,4-Dinitrophenol	1900 U	11000 U	4,225
4-Nitrophenol	1900 U	11000 U	4,225
Dibenzofuran	390 U	2200 U	845
2,4-Dinitrotoluene	390 U	2200 U	845
Diethylphthalate	390 U	2200 U	845
4-Chlorophenyl-phenylether	390 U	2200 U	845
Fluorene	390 U	2200 U	845
4-Nitroaniline	1900 U	11000 U	4,225
4,6-Dinitro-2-methylphenol	1900 U	11000 U	4,225
N-Nitrosodiphenylamine (1)	390 U	2200 U	845
4-Bromophenyl-phenylether	390 U	2200 U	845
Hexachlorobenzene	390 U	2200 U	845
Pentachlorophenol	1900 U	11000 U	4,225
Phenanthrene	390 U	2200 U	845
Anthracene	390 U	2200 U	845
Di-n-butylphthalate	390 U	2200 U	845
Fluoranthene	59 J	2200 U	686

Table 4-5
(continued)

Page 2 of 2

Constituent	Minimum Concentration (µg/kg)	Maximum Concentration (µg/kg)	Mean Concentration ^b (µg/kg)
Butylbenzylphthalate	390 U	2200 U	845
3,3'-Dichlorobenzidine	770 U	4300 U	1,663
Benzo(a)anthracene	77 J	2200 U	767
Chrysene	41 J	2200 U	682
Bis(2-ethylhexyl)phthalate	46 J	2200 U	675
Di-n-octyl phthalate	390 U	2200 U	845
Benzo(b)fluoranthene	64 J	2200 U	764
Benzo(k)fluoranthene	67 J	2200 U	764
Benzo(a)pyrene	68 J	2200 U	764
Indeno(1,2,3-cd)pyrene	390 U	2200 U	845
Dibenzo(a,h)anthracene	390 U	2200 U	845
Benzo(g,h,i)perylene	390 U	2200 U	845
N-Nitrosodimethylamine	390 U	2200 U	845
Benzidine	1900 U	11000 U	4,225
1,2-Diphenylhydrazine	390 U	2200 U	845

^aRefer to Figure 4-1 for background/baseline sampling locations (Borough Park).

^bComplete background/baseline data for soil are presented in Appendix K.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Associated value was analyzed for and was not detected but must be estimated due to quality control considerations.

Note: Where a constituent was identified as nondetectable (U), and therefore the minimum detection limit reported, this value was factored into the determination of the mean.

Table 4-6
Representative Background Pesticide/PCB
Concentrations in Soil, Maywood Site^{a,b}

Constituent	Minimum Concentration ($\mu\text{g}/\text{kg}$)	Maximum Concentration ($\mu\text{g}/\text{kg}$)	Mean Concentration ($\mu\text{g}/\text{kg}$)
alpha-BHC	4.6 U	26 U	11.2
beta-BHC	4.6 U	26 U	11.2
delta-BHC	4.6 U	26 U	11.2
gamma-BHC (Lindane)	4.6 U	26 U	11.2
Heptachlor	4.6 U	26 U	11.2
Aldrin	4.6 U	26 U	11.2
Heptachlor epoxide	4.6 U	26 U	11.2
Endosulfan I	4.6 U	26 U	11.2
Dieldrin	9.2 U	52 U	22.5
4,4'-DDE	9.2 U	52 U	22.5
Endrin	9.2 U	52 U	22.5
Endosulfan II	9.2 U	52 U	22.5
4,4'-DDD	9.2 U	52 U	22.5
Endosulfan sulfate	9.2 U	52 U	22.5
4,4'-DDT	9.2 U	52 U	22.5
Methoxychlor	46 U	260 U	112
Endrin ketone	9.2 U	52 U	22.5
Endrin aldehyde	9.2 U	52 U	22.5
alpha-Chlordane	46 U	260 U	112
gamma-Chlordane	46 U	260 U	112
Toxaphene	92 U	520 U	224.8
Aroclor-1016	46 U	260 U	112
Aroclor-1221	46 U	260 U	112
Aroclor-1232	46 U	260 U	112
Aroclor-1242	46 U	260 U	112
Aroclor-1248	46 U	260 U	112
Aroclor-1254	92 U	520 U	224.8
Aroclor-1260	92 U	520 U	224.8

^aRefer to Figure 4-1 for background sampling locations (Borough Park).

^bComplete background data for soil are presented in Appendix K.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

Note: Where a constituent was identified as nondetectable (U), and therefore the minimum detection limit reported, this value was factored into the determination of the mean.

Table 4-7
Analyses of Monazite Sands After Concentration

Item	Percentage Range			
	Brazil	India and Ceylon	United States	Malaya and Australia
ThO ₂	1.1-10.0	7.9-10.8	1.2-7.0	3.4-8.4
Ce ₂ O ₃	31.2-32.5	26.7-31.9	31.4-37.3	25.5-33.7
P ₂ O ₅	25.5-29.3	24.6-27.7	18.4-29.3	23.7-27.9
SiO ₂	0-10.1	0.9-2.5	0.3-6.4	0.9-2.2
ZrO ₂	0-5.7		0-3.2	
TiO ₂	0-2.6		0-4.7	
Fe ₂ O ₃	0-4.2	0.8-1.5	0-7.8	0.4-2.8
Al ₂ O ₃	0-0.8	0.1-0.7	0-2.5	0.03-0.8
(La, Di) ₂ O ₃	26.0-36.0	28.5-33.5	0-31.6	30.3-35.5
CaO	0-1.1	0.1-0.8	0-1.2	0.2-0.9
H ₂ O	0-0.9	0.2-2.2	0-0.2	0.5-1.3
Miscellaneous	0-1.2	0-2.7	0-7.7	

Source: F. L. Cuthbert, Thorium Production Technology,
 Addison-Wesley Publishing Co., Reading, Mass., 1958.

Table 4-8
Data Collected from Interiors of Buildings, Stepan Property^a

Building No. and Location	Transferrable Alpha		Direct Surface Alpha	Direct Beta-gamma			Range	Avg.	No. of Measurements
	Range	Avg.	No. of Samples	Range	Avg.	No. of Measurements			
4 (floor)	<2 - 8	2.3	5	26 - 115	51.2	48	587 - 4316	1,271.4	48
4 (wall)	<2 - 2	2.0	3	36 - 95	51.0	12	587 - 1557	979.4	12
4 (beams)	<12 - <12	<12.0	6	60 - 60	60.0	6	446 - 1239	661.0	6
10 (floor)	2 - 5	2.1	17	<25 - <60	<38.6	54	<547 - 2777	946.8	54
10 (beams)	2 - 2	2.0	20	<17 - 109	32.4	36	625 - 891	638.6	36
10H (floor)	<1 - 3	2.0	2	<29 - <29	<29.0	2	660 - 708	684	2
10H (beams)	<2 - <2	<2.0	11	<17 - 45	28.9	11	<625 - 891	649.2	11
13 (floor)	<2 - 5	2.0	33	<14 - 72	25.6	66	711 - 1386	748.2	66
13 (wall)	<2 - 2	2.0	9	<14 - 53	29.8	31	711 - 1344	783.2	31
13 (beams)	1 - 5	1.9	66	31 - 196	54.0	66	547 - 772	551.1	66
14 (floor)	1 - 3	1.7	3	<29 - 229	29.0	3	518 - 897	739.0	3
15 (floor)	<2 - 2	2.0	9	17 - 28	22.9	9	549 - 1094	770.6	9
15 (admin., basement, floor)	2 - 2	2.0	24	21 - 79	36.9	22	424 - 5459	1,100.2	22
15 (admin., basement, wall)	NA ^b	NA	0	21 - 60	33.3	8	<424 - 1,489	861.8	8
20 (floor)	2 - 2	2.0	10	<11 - 85	33.9	20	776 - 3226	1,174.4	20
20 (wall)	2 - 2	2.0	2	25 - 75	50.3	12	612 - 1797	1,136.4	12
20 (beams)	<2 - 2	2.0	4	<60 - 86	73.0	4	555 - 1282	881.8	4
52,52A	1 - 3	1.4	32	<34 - 84	50.8	32	486 - 939	610.5	32
67 (floor)	BDL ^d	BDL	16	11 - 54	24.1	44	451 - 2301	1,126.9	44
67 (wall)	NA	NA	0	5 - 73	40.9	16	857 - 2,120	1,612.9	16
76 (south wall)	<2 - 5	2.2	11	<50 - 199	114.0	54	NA	NA	0
76 (north wall)	<2 - 5	2.2	25	<37 - 371	130.3	67	NA	NA	0
76 (east wall)	<2 - 11	2.6	104	83 - 817	258.5	262	NA	NA	0
76 (west wall)	<2 - 11	2.7	104	<37 - 380	103.7	261	NA	NA	0
76 (floor)	<2 - 14	2.8	622	30 - 652	135.9	630	NA	NA	0
78 (floor)	2 - 19	3.6	105	24 - 1582	284.9	108	596 - 70,832	2,689.2	108
78 (wall)	BDL	BDL	7	<21 - 349	103.0	27	<760 - 3609	2,098.5	27
78 (beams)	<2 - 2	2.0	21	34 - 221	55.9	21	<556 - 2,613	1,309.5	21
Pump house (floor)	<1 - 3	1.4	5	<43 - <85	68.2	5	<564 - <1056	<754.0	5
Guard shack (floor)	<2 - <2	<2.0	6	<17 - 45	25.7	6	<577 - 1358	903.3	6

^aData are reported in dpm/100 cm²

^bNA - Samples not analyzed/measurements not taken

^dBDL - Below limit of detection (minimum detectable activity)

Table 4-9
Summary of Metal Concentrations in Soil,
Stepan Property

Constituent	Times Detected ^a	Concentration Range (mg/kg)	Detection Limit Range (mg/kg)	Mean Background Concentration ^b (mg/kg)	Occurrences Above Mean Background	Above-Background	
						in Rad. Areas	Total Above-Background
						Total Above-Background	Total Samples Analyzed
						(percent)	(percent)
Aluminum	39	1390 - 44,000	ND	7448	6	59	15
Antimony	2	5.05 - 5.34	4.0 - 6.8	4.7	2	100	5
Arsenic	29	0.43 - 46.1	0.39 - 0.44	3.3	19	63	49
Barium	39	18.8 - 167	ND	44.6	30	63	77
Beryllium	35	0.2 - 1.8	0.2 - 0.52	0.56	10	80	26
Boron	1	44.6	17.5 - 32.2	23.6	1	100	3
Cadmium	2	1.0 - 2.1	0.7 - 1.3	0.71	2	100	5
Calcium	39	335 - 82900	ND	1210	32	72	82
Chromium	36	1.7 - 1570	1.1 - 1.2	12.8	15	93	38
Cobalt	37	2.0 - 10.3	ND	7.6	3	100	8
Copper	18	5.5 - 96.2	ND	17.9	9	78	23
Iron	39	4650 - 36000	ND	14448	3	33	8
Lead	32	0.72 - 472	ND	39	17	65	44
Lithium	15	24.7 - 728	17.5 - 30.8	23.6	15	93	38
Magnesium	39	512 - 3720	ND	1841	6	67	15
Manganese	39	31.3 - 861	ND	466	1	100	3
Molybdenum	3	22.7 - 28.3	17.5 - 32.2	23.6	2	0	5
Nickel	39	4.6 - 50.9	ND	8.8	19	74	49
Potassium	37	160 - 1480	160 - 214	405	27	59	69
Selenium	17	0.36 - 37.1	0.07 - 5.4	0.45	12	42	31
Silver	3	1.3 - 1.7	0.72 - 1.27	3.6	0	0	0
Sodium	39	41.1 - 5470	ND	62.2	35	60	90
Thallium	1	15.0	0.71 - 15.0	0.45	1	100	3
Vanadium	36	4.1 - 32.8	1.4 - 1.8	20.2	4	100	10
Zinc	24	7.7 - 238	ND	50.5	14	86	36

Concentration units - mg/kg - milligrams per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 39. Complete analytical results are presented in Appendix C.

^bWhere a constituent was nondetectable, the minimum detection limit was reported, and the detection limit was factored into the determination of the mean background concentration. Background concentrations were determined by analysis of samples from four locations judged representative of background conditions for the Maywood Site.

ND - No data; no detection limits reported.

Note: Metals not listed were not detected.

Table 4-10
Summary of Rare Earth Concentrations in Soil,
Stepan Property

Constituent	Times Detected ^a	Concentration Range (mg/kg)	Detection Limit Range (mg/kg)	Mean Background Concentration ^b (mg/kg)	Occurrences Above Mean Background	Above-Background in Rad. Areas	
						Total Above-Background (percent)	Total Above-Background Total Samples Analyzed (percent)
Cerium	16	48.6 - 6620	37 - 59.5	47.3	16	94	41
Dysprosium	5	71.8 - 94.5	36.1 - 61.6	47.2	5	100	13
Gadolinium	7	36.2 - 192	37 - 61.6	47.2	6	100	15
Lanthanum	12	52.4 - 3770	37 - 61.6	47.2	12	92	31
Lutetium	2	1070 - 1090	37 - 64.4	47.2	2	100	5
Neodymium	12	46.2 - 2400	37 - 61.6	47.2	11	92	28
Samarium	6	54.1 - 454	34.9 - 61.6	47.2	6	100	15
Terbium	3	45.3 - 58.9	36.1 - 64.4	59	0	0	0

Concentration units - mg/kg - milligrams per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 39. Complete analytical results are presented in Appendix C.

^bWhere a constituent was nondetectable, the minimum detection limit was reported, and the detection limit was factored into the determination of the mean background concentration. Background concentrations were determined by analysis of samples from four locations judged representative of background conditions for the Maywood Site.

Note: Rare earth elements not listed were not detected.

Table 4-11
Summary of VOC Concentrations in Soil,
Stepan Property

Constituent	Times Detected ^a	Concentration Range (µg/kg)	Quantitation Limit Range (µg/kg)	Mean Baseline Concentration (µg/kg)	Occurrences Above Mean Baseline	Above-Baseline in Rad. Areas Total Above-Baseline (percent)	Percentage of Detections Above Mean Baseline
tetrachloroethene	3	2 - 15	6 - 28	5.3	1	100	8
toluene	6	1 - 190	2 - 6	4.8	4	50	33
trichloroethene	4	1 - 30	6 ^b	6.3	1	0	8
xylenes (total)	2	1 - 3	6 - 28	6.3	0	0	0
carbon tetrachloride	2	3 - 16	6 - 28	6.3	1	0	8
chloroform	2	1 - 5	6 - 28	6.3	0	0	0
-Butanone	1	18	11 - 96	12.0	1	0	8
-Hexanone	1	110	11 - 56	12.3	1	0	8
benzene	2	87	6 - 28	6.3	2	50	17
carbon disulfide	1	3	6 - 28	6.3	0	0	0

Concentration units - µg/kg - micrograms per kilogram

Data include results that are unqualified and those that are estimated. Total number of samples analyzed = 12. Complete analytical results are presented in Appendix C.

All quantitation limits equal to one value.

Table 4-12
Summary of BNAE Concentrations in Soil,
Stepan Property

Constituent	Times Detected ^a	Concentration Range (µg/kg)	Quantitation Limit Range (µg/kg)	Mean Baseline Concentration (µg/kg)	Occurrences Above Mean Baseline	Above-Baseline in Rad. Areas Total Above-Baseline (percent)	Percentage of Detections Above Mean Baseline
2-Methylnaphthalene	1	220	340 - 7500	845	0	0	0
Acenaphthene	2	1100 - 2100	340 - 7500	845	2	50	18
Anthracene	2	2300 - 5700	340 - 7500	845	2	50	18
Benzo(a)anthracene	5	120 - 9000	340 - 3800	767	3	67	27
Benzo(a)pyrene	3	63 - 9400	340 - 7500	764	2	50	18
Benzo(b)fluoranthene	3	75 - 7600	340 - 7500	764	2	50	18
Benzo(g,h,i)perylene	2	1800 - 4800	340 - 7500	845	2	50	18
Benzo(k)fluoranthene	3	71 - 7200	340 - 7500	764	2	50	18
Benzoic acid	1	210	1700 - 38000	4225	0	0	0
Bis(2-ethylhexyl)phthalate	3	64 - 140	360 - 7500	675	0	0	0
Chrysene	5	140 - 9200	340 - 7500	682	3	67	27
Di-n-butylphthalate	2	57 - 5800	340 - 7500	845	1	100	9
Dibenz(a,h)anthracene	2	270 - 470	340 - 7500	845	0	0	0
Dibenzofuran	2	400 - 1300	340 - 7500	845	1	100	9
Fluoranthene	3	270 - 25000	340 - 7500	686	2	50	18
Fluorene	2	750 - 2400	340 - 7500	845	1	100	9
Indeno(1,2,3-cd)pyrene	2	1500 - 5000	340 - 7500	845	2	50	18
Naphthalene	1	1000	340 - 7500	845	1	100	9
Orthochlorophenol	1	620	1700 - 38000	4225	0	0	0
Phenanthrene	4	230 - 21000	340 - 7500	845	2	50	18
Pyrene	6	47 - 15000	360 - 3800	690	4	75	36
1,2-Diphenylhydrazine	1	94	340 - 7500	845	0	0	0

Concentration units - µg/kg - micrograms per kilogram

Data include results that are unqualified and those that are estimated. Total number of samples analyzed = 11. Complete analytical results are presented in Appendix C.

Where a constituent was nondetectable, the minimum quantitation limit was reported, and the quantitation limit was factored into the determination of the mean baseline concentration. Baseline concentrations were determined by analysis of samples from four locations judged representative of baseline conditions for the Maywood Site.

Note: BNAE constituents not listed were not detected.

Table 4-13
Summary of Total Petroleum Hydrocarbons in Soil,
Stepan Property

Borehole ID No.	No. Samples Analyzed	Sample Depth Range (ft)	Concentration Range (mg/kg)
B3890C207	6	0 - 16.5	7.3 - 1600
B3890C208	4	0 - 8	8.5 - 770
B3890C217 ^a	4	0 - 8	8 - 47
B3890C218	4	0 - 8	41 - 140
B3890C255	4	0 - 20.2	5.4 - 60
B3890C296	3	0 - 10	80 - 9800
B3890C297	3	0 - 6	41 - 600
B3890C298	3	0 - 6	100 - 620

Concentration units - mg/kg - milligrams per kilogram

^aResults were flagged B; analyte found in associated blank.

Note: Borehole locations are shown in Figure 4-20.

Table 4-14
Toxicity Characteristics Constituents

Page 2 of 2

and Regulatory Levels

Source: of 40 CFR Part 261, Vol. 55, No. 61,
page 11844, Table IV-3.

Constituent	Regulatory Level (mg/L)
Quantitation limit is greater than the calculated regulatory level. The	
quantitation limit therefore becomes the regulatory level.	
Arsenic	5.0
Barium	100.0
Benzene	0.5
Cadmium	1.0
Carbon tetrachloride	0.5
Chlordane	0.03
Chlorobenzene	100.0
Chloroform	6.0
Chromium	5.0
o-Cresol	200.0
m-Cresol	200.0
p-Cresol	200.0
Cresol	200.0
2,4-D	10.0
1,4-Dichlorobenzene	7.5
1,2-Dichloroethane	0.5
1,1-Dichloroethene	0.7
2,4-Dinitrotoluene	0.13 ^a
Endrin	0.02
Heptachlor	0.008
Hexachlorobenzene	0.13 ^a
Hexachloro-1,3-butadiene	0.5
Hexachloroethane	3.0
Lead	5.0
Lindane	0.4
Mercury	0.2
Methoxychlor	10.0
Methyl ethyl ketone	200.0
Nitrobenzene	2.0
Pentachlorophenol	100.0
Pyridine	5.0 ^a
Selenium	1.0
Silver	5.0
Tetrachloroethene	0.7
Toxaphene	0.5
Trichloroethene	0.5
2,4,5-Trichlorophenol	400.0
2,4,6-Trichlorophenol	2.0
2,4,5-TP (Silvex)	1.0
Vinyl chloride	0.2

Table 4-15
Chemical Borehole Locations and Depths,
MISS Storage File

Borehole ^a	Coordinate		Total Depth
Number	North	East	(ft)
CP1	9875	9675	6.1
CP2-2	9868	9725	10.5
CP3-1	9885	9762	12.2
CP4-1	9900	9797	10.7
CP5	9910	9830	8.5
CP6	9810	9575	12.5
CP7	9830	9620	12.3
CP8-1	9836	9648	12.4
CP9-2	9840	9700	19.0
CP10-3	9862	9758	12.0
CP11-2	9880	9805	13.0
CP12	9875	9815	9.6
CP13	9875	9842	4.0
CP14	9800	9550	12.0
CP15-5	9810	9595	12.9
CP16	9800	9650	19.0
CP17	9800	9700	13.4
CP18	9820	9745	14.5
CP19-1	9815	9795	13.9
CP20	9835	9815	12.0
CP21	9820	9843	4.0
CP22-1	9799	9718	14.5
CP23-1	9780	9763	8.0
CP24-2	9804	9811	12.5
CP25	9846	9600	4.0
CP26	9754	9545	6.0
CP27	9750	9600	8.0
CP28-1	9753	9653	14.0
CP29-1	9741	9707	4.0
CP30-3	9706	9586	13.1
CP31-2	9700	9606	13.0
CP32-2	9700	9656	13.4
CP33	9700	9708	4.0
CP34	9660	9600	8.0
CP35-1	9665	9658	13.2
CP36	9650	9701	4.0
CP37	9630	9650	12.2

^aLocations are shown in Figure 4-26.

^bThese depths are for samples that were collected and analyzed for TCLP organics and corrosivity. Ten percent of the samples collected were analyzed.

Samples were collected in 0.6-m (2-ft) intervals.

Note: At each location, only the deepest borehole attempt is indicated.

Table 4-16
Summary of VOC Concentrations in Soil,
MISS Storage Pile

Constituent	Times Detected ^a	Concentration Range (µg/kg)	Quantitation Limit Range (µg/kg)	Mean Baseline Concentration ^b (µg/kg)	Occurrences Above Mean Baseline	Percentage of Detections Above Mean Baseline
Carbon disulfide	8	3 - 11	6 - 730	6.3	2	7
Toluene	18	1 - 3000	6 - 1700	4.8	15	54
1,1,2,2-Tetrachloroethane	1	1	5 - 730	6.3	0	0
1,1-Dichloroethane	1	1	5 - 730	6.3	0	0
1,2-Dichloroethane	1	1	5 - 730	6.3	0	0
2-Hexanone	2	1 - 6	10 - 1500	12.3	0	0
4-Methyl-2-Pentanone	1	2	10 - 1500	12.3	0	0
Benzene	2	2	5 - 730	6.3	0	0
Trichloroethene	3	2 - 15	5 - 730	6.3	1	4
2-Butanone	1	12	10 - 1500	12.0	0	0
Tetrachloroethene	1	1	5 - 730	5.3	0	0
1,2-Dichloroethene (Total)	1	1	5 - 730	6.3	0	0
Chloroform	1	1	5 - 730	6.3	0	0
Ethylbenzene	3	1 - 2	5 - 730	6.3	0	0
Xylenes (Total)	2	2	5 - 730	6.3	0	0

Concentration units - µg/kg - micrograms per kilogram.

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 28. Complete analytical results are presented in Appendix D.

^bWhere a constituent was nondetectable, the minimum quantitation limit was reported, and the quantitation limit was factored into the determination of the mean baseline concentration. Baseline concentrations were determined by analysis of samples from four locations judged representative of baseline conditions for the Maywood Site.

Table 4-17
Summary of BNAE Concentrations in Soil,
MISS Storage Pile

Constituent	Times Detected ^a	Concentration Range (µg/kg)	Quantitation Limit Range (µg/kg)	Mean Baseline Concentration ^b (µg/kg)	Occurrences Above Mean Baseline	Percentage of Detections Above Mean Baseline
1,2-Diphenylhydrazine	2	53 - 58	360 - 540	845	0	-
2,4,5-Trichlorophenol	1	83	1800 - 2700	4225	0	-
2,4-Dichlorophenol	1	150	360 - 540	845	0	-
2-Chlorophenol	1	41	360 - 540	845	0	-
2-Methylnaphthalene	5	44 - 99	360 - 540	845	0	-
4-Methyphenol	1	120	360 - 540	845	0	-
Acenaphthene	10	44 - 230	360 - 540	845	0	-
Acenaphthylene	12	48 - 170	360 - 460	845	0	-
Anthracene	22	42 - 740	390 - 420	845	0	-
Benzo(a)anthracene	28	51 - 1500	410	767	3	10
Benzo(a)pyrene	28	54 - 1500	410	764	4	14
Benzo(b)fluoranthene	28	66 - 1300	410	764	4	14
Benzo(g,h,i)perylene	25	99 - 650	390 - 410	845	0	-
Benzo(k)fluoranthene	28	67 - 1500	410	764	3	10
Benzoic acid	14	67 - 250	1900 - 2200	4225	0	-
Bis(2-ethylhexyl)phthalate	8	110 - 440	390 - 1300	675	0	-
Butylbenzylphthalate	1	360	380 - 540	845	0	-
Chrysene	28	60 - 1400	410	767	3	10
Di-n-butylphthalate	7	58 - 85	360 - 700	845	0	-
Dibenz(a,h)anthracene	13	41 - 330	360 - 460	845	0	-
Dibenzofuran	5	55 - 210	360 - 460	845	0	-
Diethylphthalate	1	61	360 - 540	845	0	-
Fluoranthene	29	76 - 3300	ND ^c	686	10	34
Fluorene	13	44 - 360	360 - 430	845	0	-
Hexachlorobutadiene	1	360	380 - 540	845	0	-
Indeno(1,2,3-cd)pyrene	25	69 - 1400	390 - 420	845	1	3
N-nitrosodiphenylamine	1	420	360 - 540	845	0	-
Naphthalene	4	46 - 130	360 - 540	845	0	-
Phenanthrene	28	57 - 2400	410	845	5	17
Phenol	7	45 - 180	360 - 540	845	0	-
Pyrene	29	78 - 2600	ND ^c	690	11	38

Concentration units - µg/kg - micrograms per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 29. Complete analytical results are presented in Appendix D.

^bWhere a constituent was nondetectable, the minimum quantitation limit was reported, and the quantitation limit was factored into the determination of the mean baseline concentration. Baseline concentrations were determined by analysis of samples from four locations judged representative of baseline conditions for the Maywood Site.

^cND - No data; no quantitation limits reported in data results.

Note: BNAE constituents not listed were not detected.

Table 4-18
Chemical Borehole Locations and Depths, MISS Onsite

Borehole Number ^a	Grid Coordinate		Estimated Depth of Borehole (ft)	Estimated Depth of Radioactive Contamination (ft)	TCLP Sample Depths (Within Depth of Radioactive Contamination) (ft)	TCL/TAL ^b Sample Depth (Within Depth of Radioactive Contamination) (ft)	Chemical Sample Depth (Below Depth of Radioactive Contamination) (ft)
	East	North					
C001	10250	9960	12	9.0	2-4	4-6	10-12
C002	10128	9982	12	9.0	8-10	4-6	10-12
C003	10226	9877	12	9.0	6-8	0-2	10-12
C004	10022	9928	15	11.0	8-10	6-8	12-14
C005	9798	9953	20	4.5	2-4	0-2	16-18
C006	9966	9688	13	Surface	0-2	-- ^c	10-12
C007	9951	9903	18	Surface	0-2	-- ^c	14-16
C008	9280	9703	22	11.0	10-12	0-2	18-20
C009	9370	9815	14	6.5	2-4	-- ^c	10-12
C010	9735	9603	7	Surface	0-2	-- ^c	4-6
C011	9552	9559	14	6.5	4-6	-- ^c	10-12
C012	9420	9574	16	13.5	12-14	10-12	14-16
C013	9352	9566	17	13.5	12-14	-- ^c	14-16
C014	9451	9402	15	10.0	2-4	-- ^c	12-14
C015	9669	9425	16	11.0	6-8	-- ^c	12-14
C016	9602	9249	17	12.5	10-12	-- ^c	14-16
C017	9752	9301	15	9.0	0-2	-- ^c	12-14
C018	9933	9153	10	2.5	0-2	-- ^c	8-10
C019	9665	9119	13	4.5	2-4	-- ^c	6-8
C020	9820	9042	14	4.5	2-4	0-2	8-10
C021	9870	9815	15	8.0	4-6	6-8	10-12
C022	10152	9946	15	7.0	6-8	4-6	10-12
C023	10025	10004	15	8.0	6-8	0-2	12-14
C024	9605	9900	15	8.0	4-6	4-6	10-12
C025	9500	9650	15	7.0	2-4	-- ^c	10-12
C026	9700	9300	15	8.0	6-8	0-2	12-14
C027	9734	9493	15	7.0	2-4	4-6	12-14
C028	9820	9353	15	8.0	0-2	-- ^c	6-8
C029	9510	9800	15	7.0	6-8	0-2	12-14
C030	9685	9919	15	8.0	6-8	4-6	10-12
C031	9875	9885	15	10.0	8-10	10-12	12-14
C032	9800	9735	15	3.0	0-2	-- ^c	4-6
C033	9735	9700	15	3.0	2-4	-- ^c	4-6
C034	9615	9595	15	5.0	2-4	-- ^c	6-8

^aBorehole locations are shown in Figure 4-27.

^b50 percent of the discrete-interval borehole samples (selected randomly) were analyzed for TCL/TAL in order to provide data for risk assessment and resolution of worker safety issues.

^cSample interval not randomly selected for TCL/TAL analysis.

Table 4-19
Discrete Sample Intervals Analyzed
for TCL Compounds in Soils, MISS Onsite

Borehole Number East	Grid Coordinate		Discrete Sample Interval (ft)
	North	Interval	
C001	10250	9960	4 - 6 ^a
C002	10128	9982	4 - 6 ^b
C003	10226	9877	0 - 2 ^b
C004	10022	9928	6 - 8 ^c
C005	9798	9953	0 - 2 ^b
C008	9280	9703	0 - 2 ^b
C012	9420	9574	10 - 12 ^a
C020	9820	9042	0 - 2 ^b
C021	10250	9815	6 - 8 ^c
C022	9870	9946	4 - 6 ^c
C023	10025	10004	0 - 2 ^b
C024	9504	9900	4 - 6 ^b
C026	9700	9300	0 - 2 ^b
C027	9735	9493	4 - 6 ^c
C029	9510	9800	0 - 2 ^b
C030	9685	9919	4 - 6 ^b
C031	9875	9985	10 - 12 ^a

^aSample interval contained undisturbed material.

^bSample interval contained disturbed material.

^cSample interval contained undisturbed and disturbed material.

Note: Borehole prefix B3890

Table 4-20
Summary of Metal Concentrations in Soil,
MISS Onsite

Constituent	Times Detected ^a	Concentration Range (mg/kg)	Detection Limit Range (mg/kg)	Mean Background Concentration ^b (mg/kg)	Occurrences Above Mean Background	Above-Background in Rad. Areas	
						Total Above-Background (percent)	Total Above-Background Total Samples Analyzed (percent)
Aluminum	60	1260 - 55,700	ND ^c	7448	11	18	16
Antimony	12	3.0 - 30.3	3.0 - 7.6	4.7	8	50	11
Arsenic	69	0.52 - 1060	ND	3.3	32	31	47
Barium	70	15.3 - 310	ND	44.6	39	33	56
Beryllium	66	0.10 - 5.3	0.189 - 0.64	0.56	14	14	20
Boron	5	23.7 - 114	15.2 - 31.2	23.6	5	20	7
Cadmium	5	0.97 - 2.3	0.46 - 1.70	0.71	5	40	7
Calcium	70	507 - 216,000	ND	1210	58	33	83
Chromium	51	1.0 - 1510	0.85 - 0.98	12.8	35	34	50
Cobalt	62	1.0 - 269	1.3 - 1.8	7.6	8	50	11
Copper	62	3.0 - 224	ND	17.9	38	39	54
Iron	66	381 - 35,400	ND	14,448	2	50	3
Lead	60	2.2 - 580	ND	39	28	36	40
Lithium	37	17.4 - 2290	15.2 - 25.5	23.6	32	19	46
Magnesium	70	137 - 6500	ND	1841	10	30	14
Manganese	67	11.4 - 588	ND	466	1	100	1
Nickel	70	2.8 - 135	ND	8.8	26	27	37
Potassium	66	167 - 1690	144 - 276	405	39	21	56
Selenium	15	0.41 - 3.40	0.29 - 7.3	0.45	13	54	19
Silver	27	0.84 - 2.8	0.69 - 3.6	3.6	0	0	0
Sodium	69	33.3 - 28,300	19	62.2	61	33	87
Vanadium	65	1.8 - 30.6	0.83 - 9.7	20.2	4	75	6
Zinc	47	13.1 - 491	ND	50.5	22	32	31

Concentration units - mg/kg - milligrams per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 70. Complete analytical results are presented in Appendix D.

^bWhere a constituent was nondetectable, the minimum detection limit was reported, and the detection limit was factored into the determination of the mean background concentration. Background concentrations were determined by analysis of samples from four locations judged representative of background conditions for the Maywood Site.

^cND - No data; no detection limits reported.

Note: Metals not listed were not detected.

Table 4-21
Summary of Rare Earth Concentrations in Soil,
MISS Onsite

Constituent	Times Detected ^a	Concentration Range (mg/kg)	Detection Limit Range (mg/kg)	Mean Background Concentration ^b (mg/kg)	Occurrences Above Mean Background	Above-Background in Rad. Areas	
						Total Above-Background (percent)	Total Above-Background Total Samples Analyzed (percent)
Cerium	18	52.6 - 3140	31.8 - 74.8	47.3	18	61	26
Dysprosium	3	52.0 - 59.2	31.8 - 67.6	47.2	3	0	4
Erbium	2	46.2 - 58.1	31.8 - 67.6	506	0	0	0
Gadolinium	2	56.7 - 129	31.8 - 67.6	47.2	2	0	3
Holmium	2	57.5 - 58.7	31.8 - 67.6	47.2	2	0	3
Lanthanum	17	40.3 - 1560	31.8 - 67.6	47.2	16	63	23
Neodymium	15	53.7 - 1310	31.8 - 67.6	47.2	15	67	21
Praseodymium	1	372	31.8 - 67.6	47.2	1	0	1
Samarium	5	44.8 - 316	31.8 - 67.6	47.2	4	75	6
Tellurium	1	106	31.8 - 67.6	47.2	1	100	1
Terbium	1	67.7	31.8 - 67.6	59	1	0	1
Ytterbium	1	68.6	31.8 - 67.6	47.2	1	0	1
Thulium	1	51.0	30.5 - 74.8	482.8	0	0	0

Concentration units - mg/kg - milligrams per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 70. Complete analytical results are presented in Appendix D.

^bWhere a constituent was nondetectable, the minimum detection limit was reported, and the detection limit was factored into the determination of the mean background concentration. Background concentrations were determined by analysis of samples from four locations judged representative of background conditions for the Maywood Site.

Note: Rare earth elements not listed were not detected.

Table 4-22
Summary of VOC Concentrations in Soil,
MISS Onsite

Mean Constituent Baseline	Percentage of	Concentration Range	Quantitation	Mean	Occurrences Above Mean Baseline	Above-Baseline	
	Detections Times		Limit	Baseline		in Rad. Areas	
	Detected ^a	($\mu\text{g}/\text{kg}$)	Range	Concentration ($\mu\text{g}/\text{kg}$)	Baseline	Total Above-Baseline (percent)	Above
1,1,1-Trichloroethane	2	3 - 5	6 - 12	6.3	0	0	0
2-Butanone	9	3 - 170	11 - 23	12.0	4	25	5
Acrolein	2	8 - 12	11 - 23	12.3	0	0	0
Carbon disulfide	13	1 - 29	6 - 20	6.3	3	67	3
Toluene	21	1 - 160	6 - 12	4.8	10	60	14
Xylenes (total)	4	2 - 4	6 - 12	6.3	0	0	0
Chloromethane	1	1 - 9	11 - 23	12.3	0	0	0
Benzene	2	2 - 21	6 - 12	6.3	1	0	1
Acrylonitrile	1	6	11 - 23	12.3	0	0	0
1,2-Dichloroethene (total)	1	2	6 - 12	6.3	0	0	0
Trichloroethene	3	1 - 5	6 - 12	6.3	0	0	0

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 73. Complete analytical results are presented in Appendix D.

^bWhere a constituent was nondetectable, the minimum quantitation limit was reported, and the quantitation limit was factored into the determination of the mean baseline concentration. Baseline concentrations were determined by analysis of samples from four locations judged representative of baseline conditions for the Maywood Site.

Table 4-23
Summary of BNAE Concentrations in Soil,
MISS Onsite

Mean Constituent Baseline	Percentage of	Quantitation	Mean	Above-Baseline			
	Detections	Concentration	Limit	Baseline	Occurrences	<u>in Rad. Areas</u>	
	Times	Range	Range	Concentration	Above Mean	Total Above-Baseline	
Detected ^a	($\mu\text{g}/\text{kg}$)	($\mu\text{g}/\text{kg}$)	($\mu\text{g}/\text{kg}$)	Baseline	(percent)	Above	
1,2-Diphenylhydrazine	6	44 - 5700	340 - 1900	845	2	0	3
2-Methylphenol	4	47 - 3100	320 - 1900	845	2	0	3
4-Methylphenol	2	58 - 300	320 - 1900	845	0	0	0
4-Nitrophenol	2	120 - 520	1700 - 9300	4225	0	0	0
Acenaphthene	6	62 - 930	340 - 1900	845	1	0	1
Acenaphthylene	3	47 - 73	320 - 1900	845	0	0	0
Anthracene	16	41 - 2600	340 - 1900	845	1	0	1
Benzo(a)anthracene	28	51 - 7300	350 - 1900	767	7	29	10
Benzo(a)pyrene	28	44 - 5000	350 - 1900	764	5	20	7
Benzo(b)fluoranthene	31	38 - 4900	350 - 1900	764	5	20	7
Benzo(g,h,i)perylene	16	50 - 2900	350 - 1900	845	2	50	3
Benzo(k)fluoranthene	28	40 - 3800	340 - 1900	764	5	20	7
Benzoic acid	4	72 - 270	1600 - 9300	4225	0	0	0
Bis(2-ethylhexyl)phthalate	28	43 - 590	49 - 1900	675	0	0	0
Butylbenzylphthalate	3	49 - 200	320 - 1900	845	0	0	0
Chrysene	30	44 - 6000	340 - 1900	682	8	25	12
Di-n-butylphthalate	20	40 - 4300	57 - 1900	845	6	67	9
Dibenz(a,h)anthracene	10	48 - 1100	340 - 1900	845	1	0	1
Dibenzofuran	5	45 - 880	340 - 1900	845	1	0	1
Fluoranthene	32	43 - 13000	340 - 1900	686	10	20	15
Fluorene	6	48 - 1400	340 - 1900	845	1	0	1
Indeno(1,2,3-cd)pyrene	16	66 - 2900	340 - 1900	845	4	25	6
N-nitrosodiphenylamine	7	42 - 2100	320 - 1900	845	1	0	1
Naphthalene	4	34 - 570	340 - 1900	845	0	0	0
Nitrobenzene	4	47 - 460	340 - 1900	845	0	0	0
Pentachlorophenol	7	44 - 250	1700 - 9300	4225	0	0	0
Phenanthrene	28	64 - 1100	340 - 1900	845	6	33	9
Phenol	5	63 - 180	49 - 1900	845	0	0	0
Pyrene	38	36 - 10000	350 - 1900	690	10	20	15

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 68. Complete analytical results are presented in Appendix D.

^bWhere a constituent was nondetectable, the minimum quantitation limit was reported, and the quantitation limit was factored into the determination of the mean baseline concentration. Baseline concentrations were determined by analysis of samples from four locations judged representative of baseline conditions for the Maywood Site.

Note: BNAE constituents not listed were not detected.

Table 4-24
Summary of Near-Surface Gamma Radiation
Measurements for Residential Vicinity Properties

Property	Near-Surface Gamma Radiation ^a (cpm) ^{b,c}
70 W. Hunter Ave., Maywood	6,000 - 21,000
79 Avenue B, Lodi	6,000 - 99,000
90 Avenue C, Lodi	7,000 - 60,000
108 Avenue E, Lodi	6,000 - 25,000
112 Avenue E, Lodi	6,000 - 42,000
113 Avenue E, Lodi	7,000 - 28,000
62 Trudy Drive, Lodi	5,000 - 38,000
136 W. Central Ave., Maywood	6,000 - 23,000

^aData obtained during near-surface walkover gamma scan using unshielded SPA-3.

^bAll data reported in counts per minute.

^cIncludes background (7,500 cpm for the Maywood area).

Table 4-25
Summary of Downhole Gamma Log Results
for Residential Vicinity Properties

Property	Downhole Gamma Log ^a (cpm) ^b
70 W. Hunter Ave., Maywood	8,000 - 20,000
79 Avenue B, Lodi	6,000 - 99,000
90 Avenue C, Lodi	3,000 - 184,000
108 Avenue E, Lodi	6,000 - 42,000
112 Avenue E, Lodi	7,000 - 55,000
113 Avenue E, Lodi	7,000 - 32,000
62 Trudy Drive, Lodi	4,000 - 486,000
136 W. Central Ave., Maywood	4,000 - 260,000

^aAll measurements made using a 5- by 5-cm (2- by 2-in.) lead-shielded NaI(Tl) gamma scintillation probe.

^bAll results are reported in counts per minute based on 1-min counts.

Table 4-26
Summary of Radiological Data for Residential Vicinity Properties

Property name	Radionuclide Concentrations in Surface Soil (pCi/g)			Radionuclide Concentrations in Subsurface Soil (pCi/g)			Depth of Subsurface Contamination (ft)	Interior Gamma Exposure Rates (μ R/h)	Exterior Gamma Exposure Rates (μ R/h)
	U-238	Ra-226	Th-232	U-238	Ra-226	Th-232			
70 W. Hunter Ave.	<3.5 - <7.1	0.4 - 1.2	<0.5 - 3.2	<1.8 - <9.2	0.5 - 1.6	0.7 - 4.4	None	N/A	9 - 12
79 Avenue B	<4.2 - <9.8	0.4 - 4.6	0.7 - 68	<0.2 - <7.1	0.3 - 1.6	0.5 - 17.9	0.5 - 1.5	N/A	6 - 8
90 Avenue C	<2.5 - <10	<0.5 - 1.9	1.5 - 17	<1.4 - <35.3	0.4 - 4.2	0.4 - 72.5	0.5 - 2.5	36 - 38	9 - 20
108 Avenue E	<4 - <27	<0.7 - <9	1.1 - 19	<1.8 - <7.8	<0.3 - 2.8	<0.3 - 13	0.5 - 1.0	N/A	6 - 10
112 Avenue E	<2.6 - <17	0.5 - 3.7	0.6 - 34	<1 - <16	<0.2 - 4.4	0.4 - 17	0.5 - 4.0	N/A	9 - 21
113 Avenue E	<2.3 - 37	<0.5 - 3.7	<0.8 - 28	<1.1 - 13	<0.3 - 1.9	<0.4 - 13	0.5 - 1.0	N/A	8 - 14
62 Trudy Dr.	<2 - <9.5	0.6 - 3.7	1.3 - 12.7	<1.4 - 18.2	<0.4 - 10.8	<0.5 - 24.9	0.5 - 9.5	N/A	11 - 19
136 W. Central Ave.	<3.4 - <22.3	<0.6 - 2.3	<0.9 - 111.6	<2.3 - <25	<0.4 - 3.8	<0.6 - 63.9	0.5 - 8.0	12 - 20	8 - 15

N/A = no interior measurements obtained because near-surface gamma measurements (coneshield) were within background levels, and there was no indication that contamination extended beneath the residence.

Table 4-27
Residential Vicinity Properties
Requested Analysis Summary

Borehole/Sample Identification	Number of Samples Analyzed ^a					
	Metals	Rare Earths	PCBs	TPH	TCLP	Pesticides ^b
B3890C352	2	2	2	2	2	0
138-VPC-001						
138-VPC-002						
B3890C353	3	3	3	3	3	0
138-VPC-003						
138-VPC-004						
138-VPC-005						
B3890C364	3	3	3	3	3	0
138-VPC-011						
138-VPC-012						
138-VPC-013						
B3890C375	4	4	4	4	4	0
138-VPC-027						
138-VPC-029						
138-VPC-030						

^aPCBs = polychlorinated biphenyls; TPH = total petroleum hydrocarbons; TCLP = toxicity characteristic leaching procedure.

^bIf the TPH concentration was determined to be greater than 1,000 ppm, the sample was analyzed for VOCs, BNAEs, and pesticides.

Table 4-28
Summary of Metal Concentrations in Soil,
Residential Vicinity Properties

Constituent	Times Detected ^a	Concentration Range (mg/kg)	Detection Limit Range (mg/kg)	Mean Background Concentration ^b (mg/kg)	Occurrences Above Mean Background	Above-Background in Rad. Areas	
						Total Above-Background (percent)	Total Above-Background Total Samples Analyzed (percent)
Aluminum	12	3450 - 15,000	ND ^c	7448	5	60	42
Antimony	3	6.1 - 9.2	5.1 - 13.8	4.7	3	67	25
Arsenic	12	0.3 - 12.7	ND	3.3	4	100	33
Barium	10	64.3 - 299	33.4 - 33.5	44.6	10	60	83
Beryllium	7	0.33 - 0.82	0.83 - 1.1	0.56	1	100	8
Cadmium	1	1.8	0.78 - 1.1	0.71	1	100	8
Calcium	10	853 - 14,300	835 - 837	1210	7	100	58
Chromium	11	3.1 - 221	1.7	12.8	6	83	50
Cobalt	7	3.6 - 7.3	8.3 - 11.5	7.6	0	0	0
Copper	8	12.4 - 60.2	4.2	17.9	5	80	42
Iron	12	4320 - 15,900	ND	14,448	1	100	8
Lead	12	4.2 - 1000	ND	39	7	43	58
Magnesium	9	808 - 2400	835 - 837	1841	3	100	25
Manganese	12	41.3 - 252	ND	466	0	0	0
Nickel	7	5.5 - 15.0	6.7 - 9.2	8.8	5	80	42
Potassium	7	223 - 566	835 - 1150	405	2	100	17
Selenium	5	0.43 - 2.2	0.30 - 0.47	0.45	4	75	42
Sodium	7	46.5 - 115	835 - 1150	62.2	2	100	17
Vanadium	11	11.4 - 31.4	8.4	20.2	2	100	17
Zinc	11	17.3 - 655	ND	50.5	6	100	50

Concentration units - mg/kg - milligrams per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 12. Complete analytical results are presented in Appendix E.

^bWhere a constituent was nondetectable, the minimum detection limit was reported, and the detection limit was factored into the determination of the mean background concentration. Background concentrations were determined by analysis of samples from four locations judged representative of background conditions for the Maywood Site.

^cND - No data; no detection limits reported.

Note: Metals not listed were not detected.

Table 4-29
Summary of Rare Earth Concentrations in Soil,
Residential Vicinity Properties

Constituent	Times Detected ^a	Concentration Range (mg/kg)	Detection Limit Range (mg/kg)	Mean Background Concentration ^b (mg/kg)	Occurrences Above Mean Background	Above-Background in Rad. Areas	
						Total Above-Background (percent)	Total Above-Background Total Samples Analyzed (percent)
Cerium	5	53.1 - 652	33.4 - 41.2	47.3	5	100	42
Lanthanum	4	53.0 - 485	33.4 - 97.4	47.2	4	100	33
Lutetium	1	1150	33.4 - 55.3	47.2	1	100	8
Neodymium	2	65.8 - 336	46.5 - 54.4	47.2	2	100	17

Concentration units - mg/kg - milligrams per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 12. Complete analytical results are presented in Appendix E.

^bWhere a constituent was nondetectable, the minimum detection limit was reported, and the detection limit was factored into the determination of the mean background concentration. Background concentrations were determined by analysis of samples from four locations judged representative of background conditions for the Maywood Site.

Note: Rare earth elements not listed were not detected.

Table 4-30
Summary of Near-Surface Gamma Radiation Measurements for
Commercial/Governmental Vicinity Properties

Radiation ^a Property	Near-Surface (cpm) ^{b,c}	Gamma
200 Route 17, Maywood (Sears Repair Center)	5,000 - 80,000	
Essex Street and Route 17, Maywood (Joseph Muscarelle & Associates)	7,000 - 45,000	
113 Essex St., Maywood (National Community Bank)	5,000 - 22,000	
Interstate 80, Lodi (Westbound Right-of-Way)	6,000 - 25,000	
205 Maywood Ave., Maywood (Myron Manufacturing)	4,000 - 56,000	

^aData are from near-surface walkover gamma scan using unshielded gamma scintillation detector at 1 m (3 ft) above ground surface.

^bAll data reported in counts per minute.

^cIncludes background (7,500 cpm for the Maywood area).

Table 4-31
Summary of Downhole Gamma Log Results
for Commercial/Governmental Vicinity Properties

Property	Downhole Gamma Log ^a (cpm) ^b
200 Route 17, Maywood (Sears Repair Center)	5,000 - 168,000
Essex Street and Route 17, Maywood (Joseph Muscarelle & Associates)	7,000 - 41,000
113 Essex St., Maywood (National Community Bank)	5,000 - 83,000
Interstate 80, Lodi (Westbound Right-of-Way)	4,000 - 47,000
205 Maywood Ave., Maywood (Myron Manufacturing)	1,000 - 97,000

^aAll measurements taken using a 5- by 5-cm (2- by 2-in.) lead-shielded NaI(Tl) gamma scintillation probe.

^bAll results are reported in counts per minute based on 1-minute counts.

Table 4-32

Summary of Radiological Data for Commercial/Governmental Vicinity Properties

Property name	Radionuclide Concentrations in Surface Soil (pCi/g)			Radionuclide Concentrations in Subsurface Soil (pCi/g)			Depth of Contamination (ft)	Exterior Gamma Exposure Rates (μ R/h)
	U-238	Ra-226	Th-232	U-238	Ra-226	Th-232		
200 Route 17, Maywood (Sears Repair Center)	<1.8 - <1.9	0.3 - 5.6	<0.4 - 18.7	<1.3 - <12	0.3 - 4.3	0.3 - 59.4	0.5 - 4.0	6 - 23
Essex Street and Route 17, Maywood (Joseph Muscarelle & Associates)	<1.6 - 15	0.3 - 4.5	0.4 - 22	<1.2 - <10	0.3 - 1.8	<0.6 - 6.1	0.5 - 1.0	6 - 17
113 Essex St., Maywood (National Community Bank)	<2.8 - <5.1	<0.6 - 1.5	<0.8 - 5.6	9.0 - <14	0.3 - 10	0.2 - 18	0.5 - 9.0	5 - 17
Interstate 80, Lodi (Westbound Right-of-Way)	<2.5 - <4.6	<0.6 - <0.8	<0.8 - 3.3	<1.4 - <10.6	<0.3 - 7.3	0.4 - 5.2	1.0 - 5.5	6 - 12
205 Maywood Ave., Maywood (Myron Manufacturing)	<3 - <9.3	<0.6 - 4.1	0.6 - 9.8	<1.4 - <9.7	<0.1 - 2.5	0.4 - 31	0.5 - 2.0	5 - 13

Table 4-33
Commercial/Governmental Vicinity Properties
Requested Analysis Summary

Borehole/Sample Identification	Number of Samples Analyzed ^a					
	Metals	Rare Earths	PCBs	TPH	TCLP	Pesticides ^b
B3890C570	4	4	3	4	4	1
138-MWC-015						
138-MWC-016						
138-MWC-017						
138-MWC-018						
B3890C530	4	4	3	4	4	1
138-MWC-001						
138-MWC-002						
138-MWC-003						
138-MWC-004						
B3890C622	3	3	3	3	3	0
138-MWC-020						
138-MWC-021						
138-MWC-022						
B3890C628	3	3	2	3	3	1
138-MWC-033						
138-MWC-034						
138-MWC-035						
B3890C630	5	5	5	5	5	0
138-MWC-041						
138-MWC-042						
138-MWC-043						
138-MWC-044						
138-MWC-045						

^aPCBs = polychlorinated biphenyls; TPH = total petroleum hydrocarbons; TCLP = toxicity characteristic leaching procedure.

^bIf the TPH concentration was determined to be greater than 1,000 ppm, the sample was analyzed for VOCs, BNAEs, and pesticides.

Table 4-34
Summary of Metal Concentrations in Soil,
Commercial/Governmental Vicinity Properties

Constituent	Times Detected ^a	Concentration Range (mg/kg)	Detection Limit Range (mg/kg)	Mean Background Concentration ^b (mg/kg)	Occurrences Above Mean Background	Above-Background in Rad. Areas	
						Total Above-Background (percent)	Total Above-Background Total Samples Analyzed (percent)
Aluminum	16	1470 - 11,900	ND ^c	7448	4	100	21
Antimony	1	6.1	3.6 - 5.7	4.7	1	0	5
Arsenic	15	0.5 - 5.3	2.1	3.3	4	75	21
Barium	16	36 - 425	ND	44.6	14	50	74
Beryllium	12	0.17 - 0.92	0.18	0.56	1	100	5
Calcium	16	903 - 13,400	ND	1210	13	54	68
Chromium	8	1.7 - 238	ND	12.8	3	100	16
Cobalt	14	2.4 - 11.4	11.7 - 12.9	7.6	2	100	5
Copper	12	5.4 - 101	ND	17.9	9	56	47
Iron	16	11.1 - 20,700	ND	14,448	3	100	16
Lead	15	2.9 - 455	ND	39	10	60	53
Magnesium	16	689 - 7050	ND	1841	7	57	37
Manganese	16	34.8 - 294	ND	466	0	0	0
Nickel	16	3.2 - 23.3	ND	8.8	5	80	26
Potassium	8	170 - 1440	147 - 1170	405	3	67	16
Selenium	6	0.44 - 1.4	0.31 - 0.44	0.45	5	40	26
Silver	1	0.9	0.73 - 2.1	3.6	0	0	0
Sodium	12	34.8 - 147	880 - 1290	62.2	10	40	53
Thallium	1	0.66	0.69 - 2.2	0.45	1	0	5
Vanadium	16	3.9 - 36.7	ND	20.2	4	100	21
Zinc	16	11.7 - 113	ND	50.5	10	50	53

Concentration units - mg/kg - milligrams per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 19. Complete analytical results are presented in Appendix F.

^bWhere a constituent was nondetectable, the minimum detection limit was reported, and the detection limit was factored into the determination of the mean background concentration. Background concentrations were determined by analysis of samples from four locations judged representative of background conditions for the Maywood Site.

^cND - No data; no detection limits reported.

Note: Metals not listed were not detected.

Table 4-35
Summary of Rare Earth Concentrations in Soil,
Commercial/Governmental Vicinity Properties

Constituent	Times Detected ^a	Concentration Range (mg/kg)	Detection Limit Range (mg/kg)	Mean Background Concentration ^b (mg/kg)	Occurrences Above Mean Background	Above-Background in Rad. Areas	
						Total Above-Background (percent)	Total Above-Background Total Samples Analyzed (percent)
Cerium	6	48.2 - 309	35.2 - 51.5	47.3	6	50	32
Erbium	1	47.8	32.7 - 51.5	506	0	0	0
Lanthanum	6	46.5 - 952	35.2 - 51.5	47.2	5	60	26
Lutetium	1	646	32.0 - 51.5	47.2	1	100	5
Neodymium	4	39.7 - 158	35.2 - 51.5	47.2	3	100	16
Tellurium	1	644	32.0 - 51.5	47.2	1	100	5
Terbium	1	62.2	32.7 - 51.5	59	1	100	5
Thulium	3	148 - 204	32.0 - 51.5	482.8	0	0	0

Concentration units - mg/kg - milligrams per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 19. Complete analytical results are presented in Appendix F.

^bWhere a constituent was nondetectable, the minimum detection limit was reported, and the detection limit was factored into the determination of the mean background concentration. Background concentrations were determined by analysis of samples from four locations judged representative of background conditions for the Maywood Site.

Note: Rare earth elements not listed were not detected.

Table 4-36
Summary of VOC Concentrations in Soil,
Commercial/Governmental Vicinity Properties

Mean Constituent	Percentage of Detections Times Detected ^a	Concentration Range ($\mu\text{g}/\text{kg}$)	Quantitation Limit Range ($\mu\text{g}/\text{kg}$)	Mean Baseline Concentration ($\mu\text{g}/\text{kg}$)	Occurrences Above Mean Baseline	Above-Baseline	
						in Rad. Areas	
						Total Above-Baseline (percent)	Above Baseline
2-Butanone	2	3 - 19	11	12.0	1	100	33
Carbon disulfide	1	3	6	6.3	0	0	0
Tetrachloroethene	2	1 - 6	6	5.3	1	100	33
Toluene	1	3	6	4.8	0	0	0
Trichloroethene	1	1	6	6.3	0	0	0
Xylenes (Total)	1	7	6	6.3	1	100	33

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 3. Complete analytical results are presented in Appendix F.

^bWhere a constituent was nondetectable, the minimum quantitation limit was reported, and the quantitation limit was factored into the determination of the mean baseline concentration. Baseline concentrations were determined by analysis of samples from four locations judged representative of baseline conditions for the Maywood Site.

Table 4-37
Summary of BNAE Concentrations in Soil,
Commercial/Governmental Vicinity Properties

Mean Constituent Baseline	Percentage of	Quantitation	Mean	Occurrences Above Mean Baseline	Above-Baseline		Above	
	Detections	Concentration	Limit		Baseline	in Rad. Areas		
	Times	Range	Range		Concentration	Total Above-Baseline		(percent)
Detected ^a	($\mu\text{g}/\text{kg}$)	($\mu\text{g}/\text{kg}$)	($\mu\text{g}/\text{kg}$)	Baseline				
Anthracene	1	62	380 - 830	845	0	0	0	
Benzo(a)anthracene	2	150 - 440	380	767	0	0	0	
Benzo(a)pyrene	2	200 - 460	380	764	0	0	0	
Benzo(b)fluoranthene	2	190 - 530	380	764	0	0	0	
Benzo(g,h,i)perylene	2	97 - 180	380	845	0	0	0	
Benzo(k)fluoranthene	2	150 - 400	380	764	0	0	0	
Bis(2-ethylhexyl)phthalate	1	6100	380 - 390	675	1	100	33	
Butylbenzylphthalate	1	980	380 - 830	845	1	100	33	
Chrysene	2	190 - 510	380	767	0	0	0	
Di-n-butylphthalate	2	450 - 6300	380	845	1	100	33	
Fluoranthene	2	380 - 1100	380	686	1	100	33	
Indeno(1,2,3-cd)pyrene	1	160	380 - 830	845	0	0	0	
Phenanthrene	3	39 - 290	ND	845	0	0	0	
Pyrene	3	66 - 950	ND	690	1	100	33	

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram

^aData include results that are unqualified and those that are estimated. Total number of samples analyzed = 3. Complete analytical results are presented in Appendix F.

^bWhere a constituent was nondetectable, the minimum quantitation limit was reported, and the quantitation limit was factored into the determination of the mean baseline concentration. Baseline concentrations were determined by analysis of samples from four locations judged representative of baseline conditions for the Maywood Site.

^cND - No data, no quantitation limits reported in data results.

Note: BNAE constituents not listed were not detected.

Table 4-38
Concentrations^{a,b} of Total Uranium, Radium-226,
and Thorium-232 in Groundwater at MISS, 1990

Page 1 of 3

Sampling Location ^c	Quarter			
	1	2	3	4
Total Uranium^d				
MISS-1B	1.4	<3	<3	<3
MISS-2A	3.1	<3	<3	<3
MISS-2B	1	<3	<3	<3
MISS-3A	1.8	<3	<3	NA ^f
MISS-3B	0.9	<3	<3	NA
MISS-4A ^e	--	<3	--	<3
MISS-4B	1.8	<3	<3	<3
MISS-5B	1.6	<3	<3	<3
MISS-6A	8.9	6.1	<3	4.7
MISS-6B	1.1	<3	<3	<3
MISS-7B	7	<3	<3	<3
B38W04B ^g	<3	<3	<3	<3
B38W01S	1.3	<3	<3	<3
B38W14S	2.9	<3	<3	2
B38W14D	4.7	<3	<3	2.7
B38W15S	2.7	<3	<3	1.2
B38W15D	7.3	<3	<3	<3
B38W18D	1.6	<3	<3	<3
<u>Background</u>				
B38W02D	4	<3	<3	1
B38W05B	<3	<3	<3	<3
Radium-226				
MISS-1B	1.9	0.2	0.4	0.2
MISS-2A	2.1	0.3	0.5	0.6
MISS-2B	1.3	0.3	0.3	0.3
MISS-3A	3	0.3	0.6	1
MISS-3B	1.2	0.2	0.4	0.2
MISS-4A ^e	--	0.2	--	3
MISS-4B	1.8	0.3	0.4	0.4
MISS-5B	1.3	0.2	0.4	0.3
MISS-6A	1.5	0.3	0.4	1
MISS-6B	0.9	0.2	0.3	0.4
MISS-7B	0.8	0.8	0.1	0.4
B38W04B ^g	0.2	0.3	0.7	0.3
B38W01S	1	0.2	0.4	0.9
B38W14S	1.2	0.1	0.4	0.3
B38W14D	1.3	0.1	0.4	0.3

Table 4-38
(continued)

Page 2 of 3

Sampling Location ^c	Quarter			
	1	2	3	4
Radium-226 (cont'd)				
B38W15S	2	0.4	0.3	0.3
B38W15D	1.2	<0.1	0.3	0.4
B38W18D	1.3	<0.1	0.4	0.1
<u>Background</u>				
B38W02D	2.2	0.2	0.4	1
B38W05B	0.4	0.2	0.4	0.1
Thorium-232				
MISS-1B	0.2	0.5	<0.6	<0.1
MISS-2A	0.7	<0.1	<0.2	0.2
MISS-2B	<0.2	<0.1	<0.3	<0.1
MISS-3A	1	<0.1	<0.1	0.1
MISS-3B	<0.2	<0.1	<0.1	<0.1
MISS-4A ^e	--	0.2	--	3
MISS-4B	<0.2	0.1	<0.2	<0.1
MISS-5B	<0.2	0.1	<0.1	<0.1
MISS-6A	0.8	0.2	<0.2	<0.2
MISS-6B	0.2	<0.1	<0.1	0.1
MISS-7B	<0.2	<0.3	<0.1	<0.1
B38W04B ^g	<0.2	<0.1	<0.1	<0.1
B38W01S	0.2	<0.1	<0.2	0.1
B38W14S	<0.2	<0.3	<0.2	<0.1
B38W14D	<0.2	<0.1	<0.2	<0.1
B38W15S	<0.3	<0.1	<0.1	<0.1
B38W15D	0.2	<0.1	<0.1	<0.1
B38W18D	<0.2	<0.1	<0.1	<0.1
<u>Background</u>				
B38W02D	0.5	1.8	<0.2	0.6
B38W05B	<0.1	<0.1	<0.1	<0.1

^aConcentrations are given in units of pCi/L.

^bMinimum detection limits sometimes vary as a result of inherent differences in detectors.

^cSampling locations are shown in Figure 4-66.

Table 4-38
(continued)

Page 3 of 3

^dDuring first quarter, total uranium was determined by alpha spectrometry. Except for the values for MISS-6A, B38W14S, B38W14D, B38W15S, and B38W02D which were also determined by alpha spectrometry during fourth quarter, all values were determined by the fluorometric method.

^eThis well was dry during the stated reporting period.

^fNA no analysis (sample lost in processing).

^gLocated at Stepan Company, approximately 61 m (200 ft) east of MISS wells 3A and 3B.

Table 4-39
Trend Analysis for Total Uranium, Radium-226, and Thorium-232
Concentrations^a in Groundwater at MISS, 1986-1990

Page 1 of 3

Sampling Location ^b	Annual Average Concentration					Average Value	Standard Deviation
	1986	1987	1988	1989	1990		
Total Uranium^a							
MISS-1B	1.6	3.3	2.4	2.2	3	3	0.7
MISS-2A	0.6	2.4	1.4	2.1	3	2	1
MISS-2B	0.5	2.1	0.8	1.0	3	3	1
MISS-3A	0.6	2.0	1.5	1.2	3	2	0.9
MISS-3B	0.3	3.3	1.3	0.8	2	2	1
MISS-4A ^e	--	--	3.9	5.5	3	4	1
MISS-4B	0.5	2.0	0.7	1.0	3	1	1
MISS-5B	0.3	1.5	0.7	1.5	3	1	1
MISS-6A	8.4	12.1	8.4	8.0	6	9	2
MISS-6B	0.8	2.2	1.1	1.2	3	2	0.9
MISS-7B	4.7	5.0	6.3	7.0	4	5	1
B38W04B ^f	--	--	0.8	0.9	3	2	1
B38W01S ^g	--	--	--	2.0	3	3	0.7
B38W14S ^g	--	--	--	3.2	3	3	0.1
B38W14D ^g	--	--	--	4.1	3	4	0.8
B38W15S ^g	--	--	--	2.6	3	3	0.3
B38W15D ^g	--	--	--	4.8	4	4	0.6
B38W18D ^g	--	--	--	4.8	3	4	1
Background							
B38W02D ^g	--	--	--	2.2	3	3	0.6
B38W05B ^g	--	--	--	2.0	3	3	0.7
Radium-226							
MISS-1B	0.6	0.4	0.9	1.4	0.7	0.8	0.4
MISS-2A	0.5	0.4	1.0	1.3	0.9	0.8	0.4
MISS-2B	1.5	0.4	0.7	1.0	0.6	0.8	0.4

Table 4-39

(continued)

Sampling Location ^b	Annual Average Concentration					Average Value	Standard Deviation
	1986	1987	1988	1989	1990		
Radium-226							
MISS-3A	0.6	0.6	1.2	1.6	1	1	0.4
MISS-3B	0.5	0.3	0.8	1.0	0.5	0.6	0.3
MISS-4A ^e	--	--	2.8	3.8	2	3	0.9
MISS-4B	0.4	0.5	1.4	1.3	0.7	0.9	0.5
MISS-5B	0.2	0.3	0.7	1.0	0.6	0.6	0.3
MISS-6A	0.4	0.5	2.0	1.3	0.8	1	0.7
MISS-6B	0.5	0.3	0.7	0.9	0.5	0.6	0.2
MISS-7B	0.4	0.3	1.5	0.8	0.5	0.7	0.5
B38W04B ^f	--	--	1.0	1.2	0.4	0.9	0.4
B38W01S ^g	--	--	--	1.1	0.7	0.9	0.3
B38W14S ^g	--	--	--	1.0	0.5	0.8	0.4
B38W14D ^g	--	--	--	1.0	0.5	0.8	0.4
B38W15S ^g	--	--	--	1.2	0.8	1	0.3
B38W15D ^g	--	--	--	0.7	0.5	0.6	0.1
B38W18D ^g	--	--	--	0.7	0.5	0.6	0.1
Background							
B38W02D ^g	--	--	--	0.9	1	1	0.1
B38W05B ^g	--	--	--	0.9	0.3	0.6	0.4
Thorium-232							
MISS-1B	<0.2	<0.3	<0.3	<0.3	0.3	0.3	0
MISS-2A	<0.2	<0.1	0.4	0.5	0.3	0.3	0.2
MISS-2B	<0.2	<0.1	<0.3	0.3	0.2	0.2	0.1
MISS-3A	<0.2	<0.1	0.7	0.5	0.3	0.4	0.2
MISS-3B	<0.1	<0.2	<0.3	<0.2	0.1	0.2	0.1
MISS-4A ^d	--	--	1.6	3.4	2	2	0.9
MISS-4B	<0.1	<0.1	<0.2	<0.2	0.2	0.2	0.1
MISS-5B	<0.1	<0.1	<0.2	<0.3	0.1	0.2	0.1
MISS-6A	0.1	0.3	<0.2	0.5	0.4	0.3	0.2
MISS-6B	<0.2	<0.1	0.3	<0.2	0.1	0.2	0.1

Table 4-39

(continued)

Page 3 of 3

Sampling Location ^b	Annual Average Concentration					Average Value	Standard Deviation
	1986	1987	1988	1989	1990		
Thorium-232							
MISS-7B	<0.2	<0.1	<0.3	<0.2	0.2	0.2	0.1
B38W04B ^f	--	--	<0.2	<0.2	0.1	0.2	0.1
B38W01S ^g	--	--	--	0.2	0.2	0.2	0
B38W14S ^g	--	--	--	0.4	0.2	0.3	0.1
B38W14D ^g	--	--	--	0.3	0.2	0.3	0.1
B38W15S ^g	--	--	--	0.5	0.2	0.4	0.2
B38W15D ^g	--	--	--	--	0.1	0.2	0.1
B38W18D ^g	--	--	--	0.3	0.1	0.2	0.1
Background							
B38W02D ^g	--	--	--	0.3	0.8	0.6	0.4
B38W05B ^g	--	--	--	--	0.1	0.15	0.1

NOTE: Sources of 1986-1989 data are the annual environmental reports for those years (BNI 1987b, 1988j, 1989a, 1990b).

^aConcentrations are given in units of pCi/L.

^bSampling locations are shown in Figure 4-66.

^cAverage value ± 2 standard deviations.

^dTotal uranium concentrations were determined by summing the concentrations of uranium-234, uranium-235, and uranium-238.

^eThis well was dry during the stated reporting period.

^fLocated at Stepan Company, approximately 61 m (200 ft) east of MISS wells 3A and 3B. Added to monitoring program in April 1988 to represent background.

^gInstalled in late 1988.

Table 4-40

Summary of Dissolved and Total Radionuclide Concentrations^{a,b} Detected in MISS Groundwater
 Fourth Quarter 1990 Through Third Quarter 1991

Page 1 of 4

Sampling Location ^c	Uranium		Ra-226		Ra-228		Th-232		Th-228		Th-230	
	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
4th Quarter 1990												
MI	< 5	< 5	0.1	0.2	a	a	< 0.1	< 0.01	a	a	a	a
MI	< 5	< 5	0.5	0.6	u	u	< 0.1	0.2	u	u	u	u
MI	< 5	< 5	< 0.1	0.2	u	u	< 0.1	< 0.1	u	u	u	u
MI	e	e	0.3	1.4	< 3	< 4	< 0.4	0.1	< 0.4	0.1	< 0.4	0.1
MI	e	e	0.2	0.2	< 5	< 5	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
MI	< 5	< 5	0.3	3.1	a	a	< 0.1	3.0	a	a	a	a
MI	< 5	< 5	0.3	0.4	a	a	< 0.1	< 0.1	a	a	a	a
MI	< 5	< 5	0.3	0.3	u	u	< 0.1	< 0.1	u	u	u	u
MI	5	7	0.3	1.1	a	a	< 0.1	< 0.1	a	a	a	a
MI	< 5	< 5	0.6	0.9	a	a	< 0.1	0.1	a	a	a	a
MI	< 5	< 5	0.4	0.3	u	u	< 0.1	< 0.1	u	u	u	u
	< 5	< 5	< 0.1	< 0.1	a	a	< 0.1	< 0.1	a	a	a	a
	< 5	< 5	0.2	0.3	a	a	< 0.1	< 0.1	a	a	a	a
	< 5	< 5	0.2	0.3	u	u	< 0.1	< 0.1	u	u	u	u
	< 5	< 5	0.2	0.3	a	a	< 0.1	< 0.1	a	a	a	a
	29	27	0.8	0.2	u	u	< 0.2	0.8	u	u	u	u
	< 5	< 5	0.2	0.1	a	a	< 0.1	< 0.1	a	a	a	a
	< 5	< 5	0.4	0.6	a	a	< 0.1	< 0.1	a	a	a	a
	0.8	< 2.1	< 0.1	0.3	< 30	< 10	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	1.9	2.7	0.3	0.3	< 13	e	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	1.0	1.2	0.4	0.3	< 7	e	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
	< 5	< 5	0.3	0.4	u	u	< 0.3	< 0.1	u	u	u	u
	< 5	< 5	0.1	0.5	a	a	< 0.1	1.4	a	a	a	a
	< 5	< 5	0.2	0.2	a	a	< 0.1	< 0.1	a	a	a	a
	< 5	< 5	< 0.1	0.1	u	u	< 0.1	< 0.1	u	u	u	u
Background												
	0.5	1.2	0.1	1.3	e	e	< 0.1	0.6	< 0.1	0.6	0.1	0.3
	< 5	< 5	0.2	0.1	u	u	< 0.1	< 0.1	u	u	u	u

Table 4-40
(continued)

Page 2 of 4

Sampling Location ^c	Uranium		Ra-226		Ra-228		Th-232		Th-228		Th-230	
	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
1st Quarter 1991												
MISS-1B	< 5	< 5.0	0.5	0.7	< 1	2.0	< 0.1	< 0.1	d	d	d	d
MISS-2A	< 5	< 5.0	0.2	0.4	< 1.4	< 1.2	< 0.1	0.2	d	d	d	d
MISS-2B	< 5	< 5.0	0.1	0.1	< 1.2	< 1.2	< 0.1	< 0.1	d	d	d	d
MISS-3A	< 0.9	< 0.4	0.1	1.0	< 2	< 2.0	< 0.1	1.7	< 0.1	1.7	< 0.1	0.8
MISS-3B	< 0.3	< 0.3	< 0.1	0.1	< 3	< 3.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
MISS-4A ^f												
MISS-4B	< 5	< 5.0	0.4	0.6	< 1	< 1.0	0.1	< 0.1	d	d	d	d
MISS-5B	< 5	< 5.0	0.4	0.3	< 1	< 1.0	0.2	< 0.1	d	d	d	d
MISS-6A ^f												
MISS-6B	< 5	10	0.2	0.8	< 1.4	1.7	< 0.1	0.7	d	d	d	d
MISS-7B	< 5	< 5.0	0.4	0.3	< 3	< 1.0	0.1	< 0.1	d	d	d	d
B38W03B	< 5	< 5.0	0.1	0.2	1.4	1.6	< 0.1	< 0.1	d	d	d	d
B38W04B	< 5	< 5.0	0.3	0.6	d	d	< 0.1	< 0.1	d	d	d	d
B38W06B	< 5	< 5	0.3	0.3	1.3	2.4	< 0.1	< 0.1	d	d	d	d
B38W07B	< 5	< 5	0.1	0.2	d	d	< 0.1	0.1	d	d	d	d
B38W12A	17	18	0.2	1.2	1.2	4.3	< 0.1	1.4	d	d	d	d
B38W12B	7	< 5	0.2	0.5	1.8	3.3	< 0.1	< 0.1	d	d	d	d
B38W01S	< 0.3	0.5	0.4	0.6	< 1.0	< 1.1	< 0.1	0.2	< 0.1	0.2	< 0.1	0.2
B38W14S	2.1	6.1	0.2	3.4	< 2	2.0	< 0.1	2.0	< 0.1	2.0	< 0.2	1.5
B38W14D	2.3	< 2.6	0.3	0.3	3	< 2.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
B38W15S	< 5	< 5	0.3	0.4	< 2.3	1.8	< 0.1	0.4	d	d	d	d
B38W15D	< 5	< 5	0.2	0.3	< 1.3	< 1.4	< 0.1	< 0.1	d	d	d	d
B38W17A	< 5	< 5	0.2	1.8	d	d	< 0.1	1.2	d	d	d	d
B38W17B	< 5	< 5	0.2	0.2	d	d	< 0.1	< 0.1	d	d	d	d
B38W18D	< 5	< 5	0.5	0.4	3.8	3.1	0.1	< 0.1	d	d	d	d
Background												
B38W02D	< 0.3	< 0.3	0.2	0.2	3.7	< 2.0	< 0.1	0.1	< 0.1	0.1	< 0.1	0.1
B38W05B	< 5	< 5	0.6	0.2	< 1.1	2.0	< 0.1	< 0.1	d	d	d	d

Table 4-40
(continued)

Page 3 of 4

Sampling Location ^c	Uranium		Ra-226		Ra-228		Th-232		Th-228		Th-230	
	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
2nd Quarter 1991												
MISS-1B	< 5.0	< 5.0	0.1	0.1	d	d	< 0.1	< 0.1	d	d	d	d
MISS-2A	< 5.0	< 5.0	0.1	0.2	< 3.1	< 2.8	0.2	0.1	d	d	d	d
MISS-2B	5.5	5.5	< 0.05	0.8	d	d	< 0.1	< 0.1	d	d	d	d
MISS-3A ^f												
MISS-3B	0.2	0.4	< 0.09	0.2	< 4.4	< 4.5	< 0.06	< 0.1	< 0.06	< 0.1	< 0.06	< 0.1
MISS-4A ^f												
MISS-4B	< 5	< 5.0	0.7	0.7	< 5.4	< 5.4	< 0.1	< 0.1	d	d	d	d
MISS-5B	< 5	< 0.5	0.2	0.2	< 9.1	< 29.0	< 0.04	< 0.1	d	d	d	d
MISS-6A ^f												
MISS-6B	< 5	< 5.0	0.4	0.3	< 5.0	< 4.9	< 0.01	1.4	d	d	d	d
MISS-7B	6	15.0	0.05	0.1	e	< 6.5	< 0.06	< 0.1	d	d	d	d
B38W03B	< 5	< 5.0	0.16	0.13	d	d	< 0.16	< 0.04	d	d	d	d
B38W04B	< 5	< 5	0.26	0.39	d	d	0.04	< 0.03	d	d	d	d
B38W06B	< 5.0	< 5	0.17	0.23	d	d	< 0.02	< 0.05	d	d	d	d
B38W07B	6.0	5.0	0.05	0.30	d	d	< 0.06	0.24	d	d	d	d
B38W12A	11.7	10.7	0.18	0.12	d	d	< 0.09	1.22	d	d	d	d
B38W12B	< 5	< 5	0.15	0.20	d	d	< 0.09	0.13	d	d	d	d
B38W01S ^f												
B38W14S	2	3.3	0.14	0.4	< 5.3	< 4.4	< 0.07	0.2	< 0.07	0.2	< 0.07	0.2
B38W14D	2.5	7.8	< 0.1	0.2	< 4.1	< 5.0	< 0.02	0.1	< 0.02	0.1	0.06	0.2
B38W15S	< 5	< 5.0	< 0.1	0.2	< 2.5	< 2.9	< 0.02	0.2	d	d	d	d
B38W15D	6	7.0	< 0.1	0.3	< 2.4	< 2.8	< 0.04	< 0.1	d	d	d	d
B38W17A	< 5	< 5.0	< 0.1	0.5	d	d	< 0.03	4.18	d	d	d	d
B38W17B	< 5	< 5.0	0.19	0.29	d	d	0.07	< 0.04	d	d	d	d
B38W18D	7	17.0	0.09	0.2	< 7.6	< 9.0	< 0.04	0.8	d	d	d	d
Background												
B38W02D	0.37	0.5	0.12	0.2	< 2.3	< 2.3	< 0.05	< 0.2	< 0.05	< 0.2	< 0.05	< 0.1
B38W05B	6.0	< 5	0.09	0.17	d	d	< 0.06	0.08	d	d	d	d

Table 4-40
(continued)

Page 4 of 4

Sampling Location ^c	Uranium		Ra-226		Ra-228		Th-232		Th-228		Th-230		
	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	
3rd Quarter 1991													
MISS-2A ^f	I	< 5.0	< 5.0	0.08	0.43	< 1.62	< 2.73	< 0.04	0.04	< 0.04	0.04	< 0.04	0.04
	I	< 5.0	< 5.0	< 0.01	< 0.07	< 1.51	< 6.16	< 0.06	< 0.07	< 0.06	< 0.07	< 0.07	< 0.04
MISS-4A ^f	I	< 5.0	< 5.0	0.39	3.66	1.50	< 3.83	< 0.06	0.27	< 0.06	0.27	< 0.05	0.13
	I	< 5.0	< 5.0	0.49	0.15	0.61	< 3.26	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.02
	I	< 5.0	< 5.0	< 0.1	0.46	< 1.32	< 3.87	< 0.04	< 0.07	< 0.04	< 0.07	< 0.05	< 0.03
	I	< 5.0	< 5.0	0.35	< 0.08	< 1.81	< 3.48	< 0.03	< 0.03	^g	< 0.03	^g	< 0.03
	I	6.0	< 5.0	< 0.11	0.43	< 4.47	^e	< 0.04	0.72	< 0.04	0.72	< 0.04	0.86
	I	< 5.0	< 5.0	< 0.11	0.36	< 2.14	< 1.22	< 0.18	0.16	< 0.18	0.16	< 0.18	0.06
	I	< 5.0	^e	< 0.11	^e	< 4.43	^e	< 0.07	^e	< 0.07	^e	< 0.04	^e
		< 5.0	< 5.0	0.42	0.15	< 2.08	< 3.26	< 0.04	< 0.03	^g	< 0.03	^g	< 0.03
		< 5.0	6.0	0.24	0.25	< 2.59	3.00	< 0.27	< 0.03	-	< 0.03	-	< 0.03
		< 5.0	6.0	< 0.11	0.19	< 4.43	< 2.96	< 0.07	0.04	< 0.07	< 0.04	< 0.04	< 0.05
	15.0	16.0	< 0.1	0.54	2.54	< 7.78	< 0.05	0.89	< 0.05	0.89	< 0.04	0.26	
	< 5.0	< 5.0	0.16	0.15	< 11.45	< 2.91	< 0.05	< 0.04	< 0.05	< 0.04	< 0.05	< 0.03	
	11.0	< 5.0	< 0.14	0.42	< 4.58	^g	< 0.05	< 0.03	< 0.05	< 0.03	< 0.04	< 0.03	
	< 5.0	6.0	< 0.27	0.44	< 6.65	^g	< 0.05	0.39	< 0.05	0.39	< 0.07	0.43	
	6.0	< 5.0	0.36	0.07	< 4.81	^g	< 0.04	0.06	< 0.04	0.06	< 0.04	< 0.03	
	< 5.0	< 5.0	< 0.11	0.22	< 4.43	^g	< 0.04	0.24	< 0.04	0.24	< 0.04	0.22	
	8.0	10.0	< 0.10	0.39	< 5.69	^g	< 0.04	0.06	< 0.04	0.06	< 0.04	0.12	
	< 5.0	9.0	0.57	0.75	< 2.19	< 3.0	< 0.12	0.33	^g	0.33	^g	0.24	
	< 5.0	< 5.0	0.49	0.38	2.50	< 3.66	< 0.03	< 0.11	^g	< 0.11	^g	< 0.11	
	< 5.0	16.0	0.33	0.21	3.96	< 3.67	< 0.20	0.16	^g	0.16	^g	< 0.03	
Background													
		5.0	< 5.0	0.12	0.46	< 3.47	^g	< 0.03	< 0.37	< 0.03	< 0.37	< 0.03	< 0.18
		9.0	8.0	0.71	0.43	< 1.94	3.48	< 0.26	< 0.03	^g	< 0.03	^g	< 0.03

^aConcentrations are given in units of pCi/L.

^bMinimum detection limits sometimes vary as a result of inherent differences in detectors.

^cSampling locations are shown in Figure 4-66.

^dAnalysis not requested.

^eNo analysis (sample lost in processing).

^fThis well was dry during the stated reporting period.

^gInsufficient sample to perform analysis.

Table 4-41
Laboratory Detection Limits for Metals Analyses of
Surface Water, Sediment, and Groundwater
at MISS

Analyte	Laboratory Detection Limit for Sediment (mg/kg)	Laboratory Detection Limit for Water (μ g/L)
Aluminum	40	200
Antimony	12	60
Arsenic		
(ICPAES ^a scan)	100	500
(Atomic absorption)	2	10
Barium	40	200
Beryllium	1	5
Boron	20	100
Cadmium	1	5
Calcium	1,000	5,000
Chromium	2	10
Cobalt	10	50
Copper	5	25
Iron	20	100
Lead		
(ICPAES scan)	100	500
(Atomic absorption)	1	5
Lithium	20	100
Magnesium	1,000	5,000
Manganese	3	15
Molybdenum	20	100
Nickel	8	40
Potassium	1,000	5,000
Selenium		
(ICPAES scan)	100	500
(Atomic absorption)	1	5
Silver	2	10
Sodium	1,000	5,000
Thallium		
(ICPAES scan)	100	500
(Atomic absorption)	2	10
Vanadium	10	50
Zinc	4	20

^aICPAES - Inductively coupled plasma atomic emission spectrophotometry.

Table 4-42
Laboratory Detection Limits for
Organic Chemical Analyses of Surface Water
and Groundwater at MISS

Page 1 of 3

Compound	Laboratory Detection Limit ($\mu\text{g/L}$)
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Volatile Organic Compounds

Chloromethane	10
Bromomethane	10
Vinyl chloride	10
Chloroethane	10
Methylene chloride	3
Acetone	10
Carbon disulfide	5
1,1-Dichloroethene	5
1,1-Dichloroethane	5
1,2-Dichloroethene (total)	5
Chloroform	5
1,2-Dichloroethane	5
2-Butanone	10
1,1,1-Trichloroethane	5
Carbon tetrachloride	5
Vinyl acetate	10
Bromodichloromethane	5
1,2-Dichloropropane	5
cis-1,3-Dichloropropene	5
Trichloroethene	5
Dibromochloromethane	5
1,1,2-Trichloroethane	5
Benzene	5
trans-1,3-Dichloropropene	5
Bromoform	5
4-Methyl-1,2-pentanone	10
2-Hexanone	10
Tetrachloroethene	5
1,1,2,2-Tetrachloroethane	5
Toluene	5
Chlorobenzene	5
Ethylbenzene	5
Styrene	5
Xylene (total)	5

Table 4-42
(continued)

Page 2 of 3

Compound	Laboratory Detection Limit ($\mu\text{g/L}$)
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Semivolatile Organic Compounds

Phenol	10
Bis(2-chloroethyl)ether	10
2-Chlorophenol	10
1,3-Dichlorobenzene	10
1,4-Dichlorobenzene	10
Benzyl alcohol	10
1,2-Dichlorobenzene	10
2-Methylphenol	10
Bis(2-chloroisopropyl)ether	10
4-Methylphenol	10
N-Nitroso-di-n-propylamine	10
Hexachloroethane	10
Nitrobenzene	10
Isophorone	10
2-Nitrophenol	10
2,4-Dimethylphenol	10
Benzoic acid	50
Bis(2-chloroethoxy)methane	10
2,4-Dichlorophenol	10
1,2,4-Trichlorobenzene	10
Naphthalene	10
4-Chloroaniline	10
Hexachlorobutadiene	10
4-Chloro-3-methylphenol	10
2-Methylnaphthalene	10
Hexachlorocyclopentadiene	10
2,4,6-Trichlorophenol	10
2,4,5-Trichlorophenol	50
2-Chloronaphthalene	10
2-Nitroaniline	50
Dimethylphthalate	10
Acenaphthylene	10
2,6-Dinitrotoluene	10
3-Nitroaniline	50
Acenaphthene	10
2,4-Dinitrophenol	50
4-Nitrophenol	50
Dibenzofuran	10
2,4-Dinitrotoluene	10
Diethylphthalate	10
4-Chlorophenyl-phenylether	10
Fluorene	10

Table 4-42
(continued)

Page 3 of 3

Compound	Laboratory Detection Limit ($\mu\text{g/L}$)
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Semivolatile Organic Compounds (cont'd)

4-Nitroaniline	50
4,6-Dinitro-2-methylphenol	50
N-Nitrosodiphenylamine (1)	10
4-Bromophenyl-phenylether	10
Hexachlorobenzene	10
Pentachlorophenol	50
Phenanthrene	10
Anthracene	10
Di-n-butylphthalate	10
Fluoranthene	10
Pyrene	10
Butylbenzylphthalate	10
3,3'-Dichlorobenzidine	20
Benzo(a)anthracene	10
Chrysene	10
Bis(2-ethylhexyl)phthalate	10
Di-n-octyl phthalate	10
Benzo(b)fluoranthene	10
Benzo(k)fluoranthene	10
Benzo(a)pyrene	10
Indeno(1,2,3-cd)pyrene	10
Dibenzo(a,h)anthracene	10
Benzo(g,h,i)perylene	10

Table 4-43
Wells Sampled and Analyses Performed
during 1990 Environmental Monitoring and
from Fourth Quarter 1990 Through Third Quarter 1991

Page 1 of 2

Wells	Analyses Performed ^a
1990 Environmental Monitoring^b for Chemical Parameters^c in Groundwater	
MISS-1B	pH, specific conductance, TOC, TOX, TAL metals, volatile and semivolatile organic compounds (once per year).
MISS-2A	
MISS-2B	
MISS-3A	
MISS-3B	
MISS-4A	
MISS-4B	
MISS-5B	
MISS-6A	
MISS-6B	
MISS-7B	
B38W04B	
B38W01S	
B38W14S	
B38W14D	
B38W15S	
B38W15D	
B38W18D	

Background

B38W02D
B38W05B

**Fourth Quarter 1990 Through Third Quarter 1991
Sampling for Chemical Parameters^c in Groundwater**

MISS-1B	pH, specific conductance, TOC, TOX, volatile and semivolatile organic compounds (once in 1991), dissolved and total TAL metals plus lithium, dissolved and total rare earth metals, total phosphate, nitrate, sulfate, and chloride.
MISS-2A	
MISS-2B	
MISS-3A	
MISS-3B	
MISS-4A	
MISS-4B	
MISS-5B	
MISS-6A	
MISS-6B	
MISS-7B	

Table 4-43
(continued)

Page 2 of 2

Wells	Analyses Performed ^a
Fourth Quarter 1990 Through Third Quarter 1991 Sampling for Chemical Parameters^c in Groundwater (continued)	
B38W03B B38W06B B38W07B B38W12A B38W12B B38W01S B38W14S B38W14D B38W15S B38W15D B38W17A B38W17B B38W18D	
<u>Background</u>	
B38W02D B38W05B	

^aQuarterly environmental monitoring sampling events occur in January, April, July, and October.

^bAll analyses performed quarterly except for volatile and semivolatile organic analyses, which are performed once a year.

^cTOC = total organic carbon; TOX = total organic halides;
TAL = Target Analyte List.

Table 4-44
Organics Detected in Groundwater at MISS, 1985-1991,
Listed by Compound

Page 1 of 3

Compound	SWDA ^a MCL (µg/L)	Well ^b	Year						
			1985	1986	1987	1988	1989	1990	1991
(Concentrations are reported in units of µg/L)									
Tetrachloroethene	5	MISS-1B	130	c	16	17	58	10	21
		MISS-2A	110	c	c	c	c	c	c
		MISS-2B	30	c	c	c	c	c	c
		MISS-3A	90	c	c	c	c	c	c
		MISS-3B	25	c	c	c	c	c	c
		MISS-4B	170	c	c	c	c	c	c
		MISS-5B	33	c	c	c	c	c	c
		MISS-6A	26	c	c	c	c	c	c
		MISS-6B	100	c	c	c	c	c	c
		MISS-7B	110	51	31	77	d	29	22
		B38W14S ^e					640	260	190
		B38W14D ^e					500	23	12
		B38W15D ^e					570	c	4
1,1,2,2-Tetrachloroethane		MISS-1B	c	40	c	c	c	c	c
		MISS-4B	13	c	c	c	c	c	c
		B38W14D ^e					16	ND	ND
Trichloroethene	5	MISS-1B	66	6.5	c	c	c	c	2
		MISS-7B ^f	9	16	8	5	d	c	2
		B38W12B ^f							4
		B38W14S ^e					55	41	30
		B38W14D ^e					64	c	2
		B38W15S ^e					c	c	1
		B38W15D ^e					150	c	1
1,1,1-Trichloroethane	200	MISS-7B	c	c	c	5	c	c	1
		B38W12A ^f							1
		B38W14S ^e					18	13	5
		B38W15S ^e					c	c	3
		B38W15D ^e					60	c	c
1,2-Dichloroethene	100	MISS-1B	c	6.3	c	c	11	c	c
		MISS-4B	c	21	78	26	750 ^d	180	41
		MISS-7B	c	19	15	7	d	14	40
		B38W03B ^f							2
		B38W14S ^e					38	13	5
		B38W14D ^e					17	c	2
		B38W15S ^e					6	360	85
		B38W15D ^e					68	c	4
		B38W17B ^f							2
1,1-Dichloroethene	7	B38W14S ^e					9	8	5
		B38W14D ^e					5	c	c
		B38W15D ^e					7	c	c
Benzene	5	MISS-2B	150	180	150	62	70	ND	ND
		MISS-3B	c	47	c	c	c	c	c
		MISS-4B	1240	28	c	c	140 ^d	c	23
		MISS-5B	660	c	160	c	c	c	c
		MISS-7B	7	c	c	c	c	c	c
		B38W03B ^f							3
		B38W06B ^f							7
		B38W07B ^f							6

Table 4-44
(continued)

Compound	SWDA ^a MCL (µg/L)	Well ^b	Year						
			1985	1986	1987	1988	1989	1990	1991
(Concentrations are reported in units of µg/L)									
Toluene	1,000	MISS-2A	38	11	c	c	c	c	c
		MISS-2B	c	c	c	c	c	c	c
		MISS-3A	33	c	c	c	c	c	c
		MISS-3B	31	c	c	c	c	c	c
		MISS-4B	55	c	c	c	340	180	150
		MISS-5B	c	25	c	c	c	c	c
		MISS-6A	25	9	c	c	c	c	c
		MISS-6B	26	c	c	c	c	c	c
		MISS-7B	16	c	c	c	c	c	c
		B38W04B ^g						25	h
		B38W01S ^e					c	c	1
		B38W14D ^e					5	c	c
		B38W15D ^e					470	c	c
Xylenes	2	MISS-4B	c	c	c	c	1800	c	
Vinyl chloride		MISS-4B	220	c	c	c	180	c	
		B38W03B ^f						1	
		B38W14S ^e					c	14	
		B38W15S ^e					57	130	
Carbon disulfide		MISS-2B	c	c	c	c	c	13	
		MISS-3B	c	c	c	c	c	7	
		MISS-4B	c	c	c	c	c	6	
		MISS-6B	c	c	c	c	c	3	
		B38W01S ^e						16	
		B38W14D ^e						2	
		B38W15D ^e						2	
Methylene chloride		MISS-1B	108	c	c	c	c	c	
		MISS-2A	1087	c	c	c	c	c	
		MISS-2B	169	c	c	c	c	c	
		MISS-3A	233	95	c	c	c	c	
		MISS-3B	267	c	c	c	c	c	
		MISS-4B	302	c	c	32	c	c	
		MISS-5B	100	c	c	c	c	c	
		MISS-6A	175	c	c	c	c	c	
		MISS-6B	145	c	c	c	c	c	
		MISS-7B	512	c	c	c	c	c	
		B38W06B ^f						c	
Bis(2-chloroethyl)ether		MISS-2B	c	c	c	c	65	40	
		B38W01S ^e					c	10	
Phenanthrene		MISS-3A	c	c	c	c	c	2	
Chloroform		MISS-2A	39	c	c	c	c	c	
		MISS-4B	c	17	c	c	c	c	
		MISS-6A	31	c	c	c	c	c	
		MISS-7B	27	c	c	c	c	c	
		B38W14D ^e					6	c	
		B38W15D ^e					c	2	
Ethylbenzene	700	MISS-4B	c	c	c	c	15	c	
2-Methylnaphthalene		MISS-4B	c	c	c	c	18	c	

Table 4-44
(continued)

Page 3 of 3

Compound	SWDA ^a MCL (µg/L)	Well ^b	Year						
			1985	1986	1987	1988	1989	1990	1991
(Concentrations are reported in units of µg/L)									
4-Methyl-2-pentanone		MISS-4B	c	c	c	c	75	c	c
Naphthalene		MISS-4B B38W04B ^g	c	c	c	c	150	43	^h
Bis(2-ethylhexyl)phthalate		MISS-1B	190	c	c	c	c	c	c
		MISS-2A	350	c	c	c	c	c	c
		MISS-2B	53	c	c	c	c	c	c
		MISS-3A	110	c	c	c	c	c	c
		MISS-3B	75	c	c	c	c	c	c
		MISS-5B	1200	c	c	c	c	c	c
		MISS-6A	61	c	21	c	17	c	c
		MISS-6B	290	c	c	c	330	c	c
Phenol		MISS-6A B38W01S ^e	c	c	c	c	34	16	2 ^c
		MISS-6B	c	c	c	c	c	c	4

^aSafe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), 40 CFR 141 Subpart G (141.6 added by 52 FR 25712, July 8, 1987; revised by 56 FR 3528, January 30, 1991).

^bWell locations are shown in Figure 4-66.

^cAnalytical result was below the detection limit listed in Table 4-42.

^dInsufficient water volume for sample collection.

^eWell was not sampled for organics until 1989.

^fWell was not part of the organics sampling program until 1991.

^gWell was not sampled for organics until 1990.

^hEquipment failure; no sample.

Table 4-45
Organics Detected in Groundwater at MISS, 1985-1991,
Listed by Well

Page 1 of 3

Well ^a	Compound ^b	Year						
		1985	1986	1987	1988	1989	1990	1991
MISS-1B	Methylene chloride	108	c	c	c	c	c	c
	Bis(2-ethylhexyl)phthalate	190	c	c	c	c	c	c
	1,1,2,2-Tetrachloroethane	130	c	16	17	58	10	21
	Tetrachloroethene	c	40	c	c	c	c	c
	Trichloroethene	c	6.5	c	c	c	c	2
	trans-1,2-Dichloroethene	7	6.3	c	c	11	c	2
MISS-2A	Methylene chloride	1087	c	c	c	c	c	c
	Bis(2-ethylhexyl)phthalate	350	c	c	c	c	c	c
	Chloroform	39	c	c	c	c	c	c
	Toluene	38	c	c	c	c	c	c
	Di-n-octyl phthalate	41	c	c	c	c	c	c
Tetrachloroethene	110	c	c	c	c	c	c	
MISS-2B	Methylene chloride	169	c	c	c	c	c	c
	Bis(2-ethylhexyl)phthalate	53	c	c	c	c	c	c
	Di-n-octyl phthalate	27	c	c	c	c	c	c
	Benzene	150	180	150	62	70	c	c
	Toluene	c	11	c	c	c	c	c
	Bis(2-chloroethyl)ether	c	c	c	c	65	40	c
	Carbon disulfide	c	c	c	c	c	c	13
Tetrachloroethene	30	c	c	c	c	c	c	
MISS-3A	Bis(2-ethylhexyl)phthalate	110	c	c	c	c	c	c
	Toluene	33	c	c	c	c	c	c
	Tetrachloroethene	90	c	c	c	c	c	c
	Methylene chloride	233	95	c	c	c	c	c
	Phenanthrene	c	c	c	c	c	c	2
MISS-3B	Methylene chloride	233	c	c	c	c	c	c
	Bis(2-ethylhexyl)phthalate	75	c	c	c	c	c	c
	Toluene	31	c	c	c	c	c	c
	Benzene	c	47	c	c	c	c	c
	Carbon disulfide	c	c	c	c	c	c	7
	Tetrachloroethene	25	c	c	c	c	c	c
MISS-4B	Bis(2-ethylhexyl)phthalate	29	c	c	c	c	c	c
	Methylene chloride	302	c	c	32	c	c	c
	Toluene	55	c	c	c	180	c	c
	Benzene	1240	28	c	c	140	c	23
	Tetrachloroethene	170	c	c	c	c	c	c
	1,1,2,2-Tetrachloroethane	13	c	c	c	c	c	c
	trans-1,2-Dichloroethene	2964	21	78	26	750	180	41
	Chloroform	c	17	c	c	c	c	c
	Ethyl benzene	c	c	c	c	15	c	c
	2-Methylnaphthalene	c	c	c	c	18	c	c
	4-Methyl-2-pentanone	c	c	c	c	75	c	c
	Naphthalene	c	c	c	c	150	c	c
	Vinyl chloride	220	c	c	c	340	180	150
	Xylene	c	c	c	c	1800	c	c
Carbon disulfide	c	c	c	c	c	c	6	
MISS-5A			c	c	c	c	c	c
			c	c	c	c	c	c
			c	c	c	c	c	c
			c	c	c	c	c	c
			c	c	c	c	c	c
MISS-5B	Methylene chloride	100	c	c	c	c	c	c
	Bis(2-ethylhexyl)phthalate	1200	c	c	c	c	c	c
	Tetrachloroethene	33	c	c	c	c	c	c
	Benzene	660	c	160	c	c	c	c
Toluene	c	25	c	c	c	c	c	

Table 4-45
(continued)

Page 2 of 3

Well ^a	Compound ^b	Year						
		1985	1986	1987	1988	1989	1990	1991
MISS-6A	Methylene chloride	175	c	c	c	c	c	c
	Chloroform	31	c	c	c	c	c	c
	Tetrachloroethene	26	c	c	c	c	c	c
	Bis(2-ethylhexyl)phthalate	61	c	21	c	17	c	c
	Toluene	25	9	c	c	c	c	c
	Phenol	c	c	c	c	c	c	2
MISS-6B	Methylene chloride	145	c	c	c	c	c	c
	Toluene	26	c	c	c	c	c	c
	Tetrachloroethene	100	c	c	c	c	c	c
	Bis(2-ethylhexyl)phthalate	290	c	c	c	330	c	c
	N-Nitrosodiphenylamine	c	c	c	c	c	c	4
	Carbon disulfide	c	c	c	c	c	c	3
MISS-7A			e	c	e	e	e	e
MISS-7B	Methylene chloride	512	c	c	c	e	c	c
	Chloroform	27	c	c	c	e	c	c
	Toluene	16	c	c	c	e	c	c
	Benzene	7	31	77	e	e	c	c
	Tetrachloroethene	110	51	31	77	e	29	22
	Trichloroethene	9	16	8	5	e	c	2
	1,1,1-Trichloroethane	c	c	c	5	e	c	1
	trans-1,2-Dichloroethene	17	19	15	7	e	14	40
B38W03B ^f	1,2-Dichloroethene							2
	Benzene							3
	Vinyl chloride							1
	Xylenes							3
B38W04B ^g	Toluene						25	h
	Naphthalene						43	h
B38W06B ^f	Acetone							22
B38W07B ^{d,f}								
B38W12A ^f	1,1,1-Trichloroethane							1
B38W12B ^f	Trichloroethene							4
B38W01S ⁱ	Phenol					34	16	c
	Bis(2-chloroethyl)ether					c	10	c
	Acetone					c	c	15
	Carbon disulfide					c	c	16
	Toluene					c	c	1
B38W14S ⁱ	Chloroform					5	5	2
	1,1-Dichloroethene					9	8	5
	1,2-Dichloroethene					38	13	15
	Tetrachloroethene					640	260	190
	1,1,1-Trichloroethane					18	13	5
	Trichloroethene					55	41	30
	Vinyl chloride					c	c	14
B38W14D ⁱ	Chloroform					6	c	c
	1,1-Dichloroethene					5	c	c
	1,2-Dichloroethene					17	c	2
	Tetrachloroethene					500	23	12
	1,1,2,2-Tetrachloroethane					16	c	c
	Toluene					5	c	c
	Trichloroethene					64	c	2
	Chloroethane					c	c	24

Table 4-45
(continued)

Well ^a	Compound ^b	Year						
		1985	1986	1987	1988	1989	1990	1991
B38W15S ⁱ	1,1-Dichloroethene					7	7	6
	1,2-Dichloroethene					6 ^c	360 ^c	85
	1,1,1-Trichloroethane							1 ^c
	Trichloroethene							
	Vinyl chloride					57	130	190
B38W15D ⁱ	1,1-Dichloroethene					7		
	1,2-Dichloroethene					68		4
	Tetrachloroethene					570		4 ^c
	Toluene					470		
	1,1,1-Trichloroethane					60		
	Trichloroethene					150 ^c		1
	Carbon disulfide							2
	Chloroform							2
B38W17A ^{d,f}								
B38W17B ^f	1,2-Dichloroethene							2
	Benzene							6
<u>Background</u>								
B38W02D ^{d,i}								
B38W05B ^{d,g}								

^aWell locations are shown in Figure 4-66.

^bConcentrations of organics are reported in units of $\mu\text{g/L}$.

^cAnalytical result was below the detection limit listed in Table 4-42.

^dNo analytes were detected at concentrations above detection limits listed in Tables 4-41 and 4-42.

^eInsufficient water volume for sample collection.

^fWell was not part of the organics sampling program until 1991.

^gWell was not sampled for organics until 1990.

^hEquipment failure; no sample.

ⁱWell was not sampled for organics until 1989.

Table 4-46
Summary of Arsenic, Chromium, Boron, and Lithium
Concentrations in Groundwater

Page 1 of 4

Quarter/Year	As		Cr		B		Li		
	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	
SDWA MCL ^a	50.0		100						
SDWA MCLG ^b			100						
Background	2.2		90.3 J		100 U		114		
OVERBURDEN WELLS									
(Concentration units = µg/L)									
MISS-2A	4/90	2310	2350	274	365	100 U	100 U	100 U	100 U
	1/91	2900 J	5640 J	63.6	22.3	100 U	100 U	100 U	100 U
	2/91	20.0 R	6310	26.1	19.6	874	850	5730	5650
MISS-3A	4/90	R	2.0 UJ	4.0 U	4.0 U	102	100 U	213	225
	1/91	106 J	252 J	2.9 U	2.9 U	100 U	100 U	100 U	100 U
	2/91	252	142	3.0 U	3.0 U	100 U	100 U	135	127
	3/91	168 J	266 J	37.2 J	4.0 UJ	100 U	100 U	119	112
MISS-4A ^c	4/90	4.2 J	2.0 UJ	71.7	8.7 B	117	174	100 U	100 U
MISS-5A ^c	4/90	2.0 UJ	2.0 UJ	4.0 U	4.0 U	581	668	940	959
	3/91	18.5 J	20.2 J	4.0 UJ	4.0 UJ	606	641	1850	1870
MISS-6A	4/90	38.4	2.0 U	14.1	4.0 U	100 U	100 U	100 U	100 U
	1/91	5.8 J	6.5 J	3.0 U	3.0 U	1410	1740	100 U	100 U
	2/91	4.8 B	2.0 U	3.0 U	3.0 U	464	486	244	251
	3/91	19.8 J	2.0 UJ	21.4 J	4.0 UJ	2740	3030	12400	13400
MISS-7A ^c	1/91	5.3 J	12.5 J	3.0 U	3.3 B	544	690	100 U	100 U
B38W01S	4/90	10.0 U	10.0 U	10.0 U	10.0 U	687	721	3540	3440
	1/91	2.0 UJ	2.0 UJ	3.0 U	3.0 UJ	596	580	100 U	100 U
	2/91	2.0 UJ	2.0 UJ	3.0 U	3.0 U	589	649	3550	3830
	3/91	2.5 J	2.0 UJ	7.3 J	4.0 U	559	535	3290	2980
B38W12A	4/90	7.7 J	5.9 J	9.1 B	4.0 U	100 U	100 U	100 U	100 U
	1/91	2 UJ	15.8 J	2.9 U	2.9 U	100 U	100 U	100 U	100 U
	2/91	13.6	3.8 B	3.0 U	3.0 U	100 U	100 U	100 U	100 U
	3/91	30.1	2.0 U	22.2 J	3.0 UJ	100 U	100 U	100 U	100 U
B38W14S	4/90	12.0 J	2.5 J	443	4.0 U	100 U	100 U	100 U	100 U
	1/91	10.5 J	2.0 UJ	1050	3.0 U	100 U	100 U	100 U	100 U
	2/91	10.5	2.0 UJ	417	3.0 U	100 U	100 U	100 U	100 U
	3/91	8.3 J	2.0 UJ	121	4.0 U	100 U	100 U	100 U	100 U

Table 4-46
(continued)

Quarter/Year	As		Cr		B		Li		
	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	
(Concentration units = µg/L)									
B38W15S	4/90	5.0 J	2.0 UJ	6.1	4.0 U	453	100 U	1370	100 U
	1/91	6.4 J	4.7 J	3 U	5.7 B	463	476	100 U	100 U
	2/91	2.0 UJ	2.0 UJ	7.4 B	3.0 U	346	415	1410	1620
	3/91	4.3 J	2.5 J	20.9	4.0 U	437	466	1470	1550
B38W17A	4/90	3.6 J	2.0 UJ	1340	4.0 U	100 U	100 U	100 U	100 U
	1/91	2.9 B	2.0 U	1020 J	2.9 U	113	103	100 U	100 U
	2/91	3.2 BJ	2.0 UJ	357	3.0 U	100	124	361	330
	3/91	10.5 J	2.0 UJ	528 J	3.0 UJ	112	136	551	499
BEDROCK WELLS									
MISS-1B	4/90	2.0 U	2.0 U	4.0 U	4.0 U	100 U	100 U	119	121
	1/91	2.0 UJ	10.0 U	2.9 U	10.0 U	100 U	100 U	100 U	149
	2/91	2.0 U	2.0 UJ	3.0 U	3.0 U	100 U	100 U	103	108
	3/91	2.0 UJ	2.0 UJ	6.1 J	4.0 UJ	100 U	102	102	100 U
MISS-2B	4/90	20.0 UJ	20.0 UJ	9.4 B	11.6	3240	3200	15700	15900
	1/91	20.0 UJ	20.0 UJ	13.4	8.6	100 U	100 U	100 U	100 U
	2/91	3.5 B	2.0 UJ	11.8	17.8	4030	4350	12600	13500
	3/91	20.0 UJ	20.0 UJ	17.6 J	12.7 J	4280	4390	16700	17900
MISS-3B	4/90	4.2 J	20.0 UJ	4.0 U	4.0 U	100 U	100 U	116	100 U
	1/91	2.0 UJ	3.6 J	2.9 U	2.9 U	100 U	100 U	100 U	100 U
	2/91	10.3 J	7.7 J	3.0 U	3.0 U	100 U	100 U	100 U	100 U
	3/91	5.3 J	4.4 J	6.0 J	4.0 J	100 U	138	161	178
MISS-4B	4/90	2.0 UJ	2.0 UJ	5.3 B	4.0 U	175	100 U	100 U	100 U
	1/91	2.0 UJ	2.0 UJ	3.0 U	3.0 U	155	187	100 U	100 U
	2/91	2.0 UJ	2.0 UJ	3.0 U	3.0 U	146	178	100 U	100 U
	3/91	2.0 UJ	2.0 UJ	8.6 J	6.4 J	147	228	100 U	102
MISS-5B	4/90	2.4 J	2.0 UJ	4.0 U	5.7	453	553	2070	2430
	1/91	2.4 J	4.7 J	3.0 U	3.0 U	444	492	100 U	100 U
	2/91	12.3 J	10.4	3.0 U	3.0 U	817	809	294	289
	3/91	18.2 J	28.7 J	7.8 J	4.0 J	650	541	1800	1890
MISS-6B	4/90	9.7	9.0 B	4.0 U	4.0 U	1840	1820	17400	16700
	1/91	2 UJ	22.5 J	3.0 U	10.0	690	777	100 U	100 U
	2/91	10.6 J	6.2 J	3.0 U	3.0 U	1310	1420	1340	1440
	3/91	5.9 J	4.4 J	7.6 J	4.0 UJ	1330	1650	14300	16500
MISS-7B	4/90	94.8	10.0 U	10.0 U	10.0 U	554	576	2940	
	1/91	4.6 J	11.6 J	3.0 U	3.0 U	593	676	100 U	100 U
	2/91	137 J	43.0 J	3.0 U	3.0 U	1490	1520	459	466
	3/91	155 J	29.2 J	4.3 J	4.0 UJ	826	894	2780	2920

Table 4-46

(continued)

Page 3 of 4

Quarter/Year	As		Cr		B		Li		
	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	
(Concentration units = $\mu\text{g/L}$)									
B38W3B	4/90	10 U	10.0 U	10.0 U	10.0 U	166	146	1000	
	1/91	2 UJ	2.0 UJ	2.9 U	2.9 U	142	142	100 U	100 U
	2/91	2 UJ	2.0 UJ	3.0 U	3.0 U	169	146	100 U	118
	3/91	2 UJ	2.0 U	6.1 J	3.0 UJ	108	125	100 U	100 U
B38W4B ^d	4/90	10.0 U	10.0 U	10.0 U	10.0 U	1690	1770	2780	100 U
	1/91	2.0 U	2.0 U	2.9 U	2.9 U	1120	1120	2000	100 U
	2/91	2.0 U	2.0 U	3.8 B	3.0 U	999	1020	2300	2380
B38W6B	4/90	10.0 U	10.0 U	10.0 U	10.0 U	178	210	503	
	1/91	2.0 UJ	2.0 UJ	3.2 B	9.9 B	133	131	100 U	100 U
	2/91	2.0 UJ	2.0 UJ	7.5 B	3.2 B	119	118	272	277
	3/91	2.0 U	2.0 U	5.6 J	5.0 J	137	161	839	997
B38W7B	4/90	10.0 U	10.0 U	12.3	10.0 U	118	160	100 U	
	1/91	2.0 U	2.0 U	10.6 J	4.2 J	118	100 U	100 U	100 U
	2/91	2.0 U	2.0 U	3.0 U	3.0 U	100 U	105	100 U	100 U
	3/91	2.0 J	2.0 J	10.1 J	4.0 UJ	100 U	105	100 U	100 U
B38W12B	4/90	2.0 UJ	2.0 UJ	8.2 B	4.0 U	100 U	100 U	100 U	100 U
	1/91	2.0 UJ	2.0 UJ	2.9 U	2.9 U	100 U	100 U	100 U	100 U
	2/91	2.0 U	2.0 U	3.0 U	3.0 U	100 U	100 U	100 U	100 U
	3/91	2.0 U	2.0 U	16.0	3.0 UJ	100 U	100 U	100 U	100 U
B38W14D	4/90	2.8 J	2.0 UJ	11.1	4.0 U	100 U	100 U	100 U	100 U
	1/91	2.0 UJ	2.0 UJ	3.0 U	3.5 B	100 U	100 U	100 U	100 U
	2/91	2.0 UJ	2.0 UJ	9.2 B	3.0 U	100 U	100 U	100 U	100 U
	3/91	2.0 UJ	2.0 UJ	5.8 J	4.0 U	100 U	100 U	100 U	100 U
B38W15D	4/90	4.0 UJ	3.7 J	13.1	4.0 U	268	288	1640	1690
	1/91	2.0 UJ	14.1 J	3.0 U	7.9 B	374	467	100 U	100 U
	2/91	2.2 B	2.7 BUJ	9.0 B	3.0 U	557	616	3350	3740
	3/91	2.0	2 UJ	21.4	5.9 J	100 U	100 U	100 U	100 U
B38W17B	4/90	3.0 J	3.6 J	4.0 U	4.0 U	100 U	100 U	100 U	100 U
	1/91	3.3 B	2.1 B	2.9 U	2.9 U	316	319	100 U	100 U
	2/91	6.1 BJ	2.7 BJ	3.0 U	3.0 U	357	345	1030	972
	3/91	4.5 J	2.2 J	3.9 J	3.0 UJ	344	382	1300	1810
B38W18D	4/90	10.0 U	10.0 U	10.0 U	10.0 U	473	475	2940	100 U
	1/91	2.0 UJ	2.0 UJ	2.9 U	2.9 U	430	522	2500	100 U
	2/91	2.0 U	2.0 UJ	265	17.6	421	379	307	392
	3/91	2.0 UJ	2.0 UJ	66.4 J	5.5 J	486	476	2950	2750

Table 4-46

(continued)

Quarter/Year	As		Cr		B		Li		
	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	
(Concentration units = µg/L)									
BACKGROUND									
B38W02D	4/90	2.0 U	2.0 U	22.0	4.2 B	100 U	100 U	100 U	100 U
	1/91	2.0 UJ	2.0 UJ	3.0 U	6.9 B	100 U	100 U	100 U	100 U
	2/91	2.0 U	2.0 U	22.2	12.3	100 U	100 U	100 U	100 U
	3/91	2.0 UJ	2.0 U	26.9	4.0 U	100 U	100 U	100 U	100 U
B38W5B	4/90	2.0 UJ	2.0 UJ	65.8	6.7	100 U	100 U	100 U	100 U
	1/91	2.0 UJ	2.0 UJ	12.0 J	2.9 U	100 U	100 U	100 U	100 U
	2/91	2.2 B	2.0 U	37.0 J	3.0 U	100 U	100 U	100 U	114
	3/91	2.2 J	2.0 UJ	90.3 J	4.3 J	100 U	100 U	100 U	100 U

Notes:

Concentrations are given in units of ug/L.

Data qualifiers are:

U = Result below stated detection limit

J = Estimated result

UJ = Estimated detection limit

B = Result below the contract required detection limit (CRDL) and above the instrument detection limit (IDL)

R = Rejected data

^aSafe Drinking Water Act (SDWA) Maximum Contaminant Levels (MCLs), 52 FR 25690 (July 8, 1987).

^bFR 30274 (July 1, 1991).

^cThis well did not contain water during the omitted reporting period(s); reporting periods are 4/90, 1/91, 2/91, and 3/91.

^dNot sampled during first quarter of 1991.

Table 4-47

Summary of Mobile Ion Concentrations^a Measured in Groundwater at MISS

Sampling Location ^b	Chloride (mg/L)				Nitrate (mg/L)				Phosphate (mg/L)				Sulfate (mg/L)			
	Quarter/Year				Quarter/Year				Quarter/Year				Quarter/Year			
	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91
MISS-1B	96	102	54.6	108	0.4	0.1	0.5	0.99	<0.05	0.03	0.03	0.02	c	18.9	23.6	51.7
MISS-2A	79.7	64.7	45.8	e	0.2	0.1	0.2	e	55	118	101	e	c	1180	1420	e
MISS-2B	143	124	14.9	145	0.1	d	0.1	0.37	0.1	0.1	0.04	0.02u	c	3430	2780	3230
MISS-3A	11	d	5.7	8.0	0.4	0.3	d	0.28	0.2	2.2	0.05	0.02u	c	171	164	152
MISS-3B	10	8.9	10.4	17.5	0.2	d	d	0.80	0.8	0.1	d	0.02u	c	241	631	678
MISS-4A	9	e	e	e	13	e	e	e	8	e	e	e	c	e	e	e
MISS-4B	29	22.2	19.8	29.6	0.2	0.3	0.2	0.25	6	2.5	0.65	0.23	c	d	238	150
MISS-5A	12	e	e	88.2	0.1	e	e	0.1u	1	e	e	0.02u	c	e	e	989
MISS-5B	98	98.9	778	90.8	0.2	0.1	d	0.67	0.2	0.3	d	0.033	c	d	1180	994
MISS-6A	10	29.4	8.3	10.3	14	d	1.6	0.58	1	1.1	d	0.037	c	d	462	498
MISS-6B	51.2	9.6	35.5	34.8	0.42	d	d	0.10	1	0.3	0.1	0.11	c	d	636	577
MISS-7B	94	94.4	121	99.4	0.3	d	0.3	0.75	0.9	0.1	0.19	0.16	c	d	2570	1500
B38WO3B	17.2	14.1	d	19.2	0.1u	0.1u	d	0.1u	0.065	0.1	d	0.02	c	847	1060	1450
B38WO4B	202	161	d	29.6	0.2	0.1u	d	0.25	0.5	0.7	d	0.23	c	20.9	d	150
B38WO6B	98.8	76.1	59.7	116	0.1u	0.1u	0.22	1.4	0.1	1.3	0.02	0.02u	c	149	219	130
B38W07B	11.9	7.6	9.1	14.0	4.2	8.8	1.1	3.3	0.11	0.1	0.06	0.058	c	46.8	58.1	101
B38W12A	d	51.6	37.6	81.4	d	0.1u	d	0.10u	d	0.6	d	0.031	c	1220	1240	1320
B38W12B	d	83.3	75.1	81.0	d	5.1	5.6	4.7	d	0.1u	d	0.02u	c	50.0u	47.4	41.5
B38W01S	15	11.4	59.7	5.6	0.1	0.1u	0.2	0.056	0.1	0.2	d	0.02u	c	1320	219	1530
B38W14S	60	92.8	64.4	21.4	1	1.7	1.9	0.10u	0.9	0.9	0.04	0.02u	c	d	76.7	68.7
B38W14D	19	16	48.9	23.6	0.2	0.4	0.8	0.1u	0.6	0.2	0.08	0.22	c	d	37.6	15.3
B38W15S	66	107	99.6	112	0.1	0.3	0.2	0.1u	0.1	0.2	0.04	0.025	c	d	283	475
B38W15D	70	112	110	12.4	0.4	d	0.4	0.1u	0.2	0.4	0.05	0.33	c	d	876	37.7
B38W17A	c	25.2	30.1	62.9	c	0.2	d	0.1u	c	0.6	0.04	0.074	c	94.6	109	137
B38W17B	c	174	161	183	c	0.1u	0.1	0.1u	c	0.7	d	0.02u	c	574	632	652
B38W18D	14	10.6	13.8	d	0.4	0.1	d	0.1	<0.05	0.1u	d	0.02u	c	306	540	438
BACKGROUND																
B38W02D	12	11.1	10.9	13.1	1	1.4	1.6	0.75	0.2	0.04	0.03	0.034	c	20u	23.7	19.2
B38WO5B	34.7	27.2	38.1	35.4	5.8	2.0	2.7	2.3	0.1	0.1u	0.04	0.036	c	23.3	43.1	28.9

^aConcentrations reported in units of mg/L. "u" indicates analytical result below listed detection limit.

^bSampling locations are shown in Figure 4-66.

^cAnalysis not requested.

^dConcentration below reporting limit.

^eWell was dry.

Table 4-48
Concentrations^a of Total Uranium, Radium-226,
and Thorium-232 in Surface Water at MISS, 1990

Sampling Location ^b	Quarter				Avg
	1	2	3	4	
Total Uranium^c					
1	<3	<3	<3	1.2	<3
2	<3	<3	<3	1.3	<3
3 ^d	<3	<3	<3	0.7	<3
4	<3	<3	<3	1	<3
Radium-226					
1	0.2	0.1	0.6	0.1	0.3
2	0.1	0.2	0.6	0.1	0.3
3 ^d	0.2	0.2	0.3	0.4	0.3
4	0.2	0.1	0.4	0.8	0.4
Thorium-232					
1	<0.1	<0.1	<0.1	<0.1	<0.1
2	<0.1	<0.1	<0.1	<0.1	<0.1
3 ^d	<0.1	<0.1	<0.1	<0.1	<0.1
4	<0.1	<0.1	<0.1	<0.1	<0.1

^aConcentrations are given in units of pCi/L.
 Note: 1 pCi/L is equivalent to 0.037 Bq/L. When all concentrations are less than the maximum detection limit, that limit is reported as the average.

^bSampling locations are shown in Figure 2-1.

^cUranium results for the fourth quarter were determined by isotopic analysis instead of the fluorometric method. Isotopic analyses are capable of lower minimum detection limits.

^dUpstream sampling location.

Table 4-49
Trend Analysis for Total Uranium, Radium-226, and Thorium-232
Concentrations^a in Surface Water at MISS, 1986-1990

Sampling Location ^b	Annual Average Concentration				Average 1990	Standard Value	Expected Deviation	Range ^c
	1986	1987	1988	1989				
Total Uranium^d								
1	<3	<3	3	<5	<3	3	0.9	2 - 5
2	<3	<3	4.3	<5	<3	4	0.9	2 - 6
3 ^e	<3	<3	3.8	<5	2	3	1	1 - 6
4 ^f	--	--	--	<5 ^g	<3	-- ^h	-- ^h	-- ^h
Radium-226								
1	0.4	0.4	0.4	0.3	0.3	0.4	0.1	0.3 - 0.5
2	0.4	0.2	0.3	0.3	0.3	0.3	0.1	0.2 - 0.4
3 ^e	0.6	0.3	0.3	0.4	0.3	0.4	0.1	0.1 - 0.6
4 ^f	--	--	--	0.4 ^g	0.4	-- ^h	-- ^h	-- ^h
Thorium-232								
1	<0.1	<0.1	<0.1	0.1	<0.1	0.1	0.0	0.1 - 0.1
2	0.1	<0.1	<0.1	<0.1	<0.1	0.1	0.0	0.1 - 0.1
3 ^e	0.1	<0.1	0.1	<0.1	<0.1	0.1	0.0	0.1 - 0.1
4 ^f	--	--	--	<0.1 ^g	<0.1	-- ^h	-- ^h	-- ^h

Note: Sources for 1986-1989 data are the site environmental reports for those years (BNI 1987b, 1988j, 1989a, 1990b).

^aConcentrations are given in units of pCi/L; all results include background.

Note: 1 pCi/L is equivalent to 0.037 Bq/L.

^bSampling locations are shown in Figure 2-1.

^cAverage value ± 2 standard deviations.

^dTotal uranium concentrations were typically determined by the fluorometric method.

^eLocation is upstream of MISS and represents background.

^fLocation established in July 1989.

^gValue is a result of one sampling effort.

^hInsufficient data to present meaningful values.

Table 4-50

Summary of Dissolved and Total Radionuclide Concentrations in Surface Water at MISS
Fourth Quarter 1990 through Third Quarter 1991

Quarter/ Year	Sampling Location ^a	Uranium (pCi/L)		Ra-226 (pCi/L)		Ra-228 (pCi/L)		Th-232 (pCi/L)		Th-228 (pCi/L)		Th-230 (pCi/L)	
		Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
4/90	1	1.2	1.2	<0.1	0.1	b	b	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
4/90	2	1.1	1.3	0.5	0.1	b	b	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
4/90	3	0.8	0.7	1.5	0.4	< 2	< 1	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
4/90	4	0.8	1	1	0.8	< 2	< 2	< 0.1	<0.1	< 0.1	< 0.1	< 0.1	< 0.1
1/91	1	0.8	< 1.1	0.2	0.3	< 3.3	< 2.4	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1/91	2	1.5	< 1.7	0.2	0.4	< 4.2	< 5.0	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
1/91	3	0.1	< 0.6	0.3	0.4	< 44	< 12.0	< 0.1	0.1	< 0.1	0.1	< 0.1	0.1
1/91	4 ^c												
2/91	1	1.2	1.3	0.08	0.2	< 1	< 1.0	< 0.2	< 0.2	< 0.2	< 0.2	0.26	< 0.1
2/91	2	1.4	1.2	0.2	0.2	< 1	< 1.0	< 0.09	< 0.2	< 1	< 0.2	< 0.1	< 0.1
2/91	3	1	1.8	0.18	0.2	1	< 0.6	< 0.09	< 0.2	1	< 0.2	< 0.1	< 0.1
2/91	4	1.5	1.5	0.75	0.2	< 0.5	< 0.8	< 0.07	< 0.1	< 0.07	< 0.1	< 0.09	< 0.1
3/91	1	< 5.0	< 5.0	< 0.09	0.55	< 1.24	< 1.75	< 0.13	< 0.05	< 0.13	< 0.05	< 0.13	< 0.05
3/91	2	< 5.0	< 5.0	0.42	0.12	< 1.33	3.94	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
3/91	3	< 5.0	< 5.0	0.18	0.21	< 1.29	< 1.26	< 0.62	< 0.38	0.88	1.88	< 0.38	< 0.38
3/91	4	< 5.0	< 5.0	0.17	0.34	< 1.55	5.38	< 0.06	0.17	< 0.06	0.17	< 0.06	< 0.12

^aSampling locations are shown in Figure 2-1.

^bSample lost in processing.

Table 4-51
Volatile Organic Compounds Detected^a
in Surface Water at MISS During
Third Quarter 1990

Sampling Location ^b	Compound	Concentration ($\mu\text{g/L}$)
2	1,2-Dichloroethene (total)	38
	Trichloroethene	13
	1,1,2,2-Tetrachloroethane	42
3 ^c	Chloroform	7

^aNo semivolatile compounds were detected.

^bSampling locations are shown in Figure 2-1.

^cUpstream sampling location.

^aConcentrations are reported in units of $\mu\text{g/L}$.

^bSampling locations are shown in Figure 2-1.

^cSampling location dry.

NOTE: Detection limits are shown directly below abbreviation for metal; "u" means analytical result was below the detection limit.

Table 4-54

Summary of Mobile Ion Concentrations^a Measured in Surface Water at MISS

Sampling Location ^b	Chloride (mg/L)			Nitrate (mg/L)					Phosphate (mg/L)				Sulfate (mg/L)			
	Quarter/Year			Quarter/Year					Quarter/Year				Quarter/Year			
	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91
1	56	162	83.5	83.8	1	3	1.4	3.2	0.2	0.1	0.4	0.67	c	88.6	53.2	52.7
2	81	90	72.8	76.3	1	1.8	0.5	0.74	0.2	0.1	d	0.083	c	115	128	154
3	172	168	74.6	197	4	1.1	2.6	0.79	0.06	0.4	d	0.025	c	18.5	36.3	38.4
4	< 5.0	d	75.9	87.3	2	d	1.4	5.3	< 0.05	d	0.1	1.4	c	d	103	35.6

^aConcentrations are reported in units of mg/L.

^bSampling locations are shown in Figure 2-1.

^cAnalysis not requested.

^dConcentration below detection level.

Table 4-55
Concentrations^a of Total Uranium, Radium-226,
and Thorium-232 in Sediment at MISS, 1990

Sampling Location ^b	Quarter				Avg
	1	2	3	4	
Total Uranium^c					
1	1.0	1.6	0.9	1.3	1
2	1.0	1.8	0.9	1.2	1
3 ^d	0.9	1.1	0.9	1.3	1
4	1.0	1.3	1.6	1.2	1.3
Radium-226					
1	0.4	0.4	0.4	0.5	0.4
2	0.3	0.9	0.3	0.7	0.5
3 ^d	0.3	0.4	0.4	1.0	0.5
4	0.4	0.5	0.6	0.8	0.5
Thorium-232					
1	0.4	0.7	0.4	0.5	0.5
2	0.5	1.0	0.1	0.5	0.5
3 ^d	0.3	0.4	0.2	0.5	0.3
4	0.4	0.9	0.3	1.3	0.7

^aConcentrations are given in units of pCi/g. Note: 1 pCi/g is equivalent to 0.037 Bq/g.

^bSampling locations are shown in Figure 2-1.

^cTotal uranium concentrations were determined by summing the concentrations of uranium-234, uranium-235, and uranium-238.

^dUpstream sampling location.

Table 4-56
Trend Analysis for Total Uranium, Radium-226, and Thorium-232
Concentrations^a in Sediment at MISS, 1986-1990

Sampling Location ^b	Annual Average Concentration				Average 1990	Standard Value	Expected Deviation	Range ^c
	1986	1987	1988	1989				
Total Uranium^d								
1	1.0	1.2	1.6	1.5	1	1	0.3	0.7 - 1.8
2	1.2	1.1	1.2	0.8	1	1	0.2	0.7 - 1.4
3 ^e	0.8	1.1	1.0	1.7	1	1	0.3	0.4 - 1.8
4 ^f	--	--	--	1.1 ^g	1.3	-- ^h	-- ^h	-- ^h
Radium-226								
1	0.2	0.4	0.4	0.5	0.4	0.4	0.1	0.2 - 0.6
2	0.3	0.3	0.4	0.4	0.5	0.4	0.1	0.2 - 0.5
3 ^e	0.4	0.4	0.3	0.6	0.5	0.4	0.1	0.2 - 0.7
4 ^f	--	--	--	0.5 ^g	0.5	-- ^h	-- ^h	-- ^h
Thorium-232								
1	0.7	0.4	0.4	0.3	0.5	0.5	0.2	0.2 - 0.8
2	0.7	0.3	0.5	0.3	0.5	0.5	0.2	0.1 - 0.8
3 ^e	0.4	0.3	0.4	0.3	0.3	0.3	0.1	0.2 - 0.4
4 ^f	--	--	--	1.5 ^g	0.7	-- ^h	-- ^h	-- ^h

NOTE: Sources of 1986-1989 data are the site environmental reports for those years (BNI 1987b, 1988j, 1989a, 1990b).

^aConcentrations are given in units of pCi/g. Note: 1 pCi/g is equivalent to 0.037 Bq/g.

^bSampling locations are shown in Figure 2-1.

^cAverage value ± 2 standard deviations.

^dTotal uranium was determined by summing concentrations of uranium-234, uranium-235, and uranium-238.

^eLocation is upstream of MISS.

^fLocation established in July 1989.

^gValue is a result of one sampling effort.

^hInsufficient data to present meaningful values.

Table 4-57
Summary of Radionuclide Concentrations Measured in
Sediments at MISS
Fourth Quarter 1990 Through Third Quarter 1991

Quarter/Year	Sampling Location ^a	Total Uranium (pCi/g)	Ra-226 (pCi/g)	Ra-228 (pCi/g)	Th-232 (pCi/g)	Th-228 (pCi/g)	Th-230 (pCi/g)
4/90	1	1.3	0.5	1.7	0.5	0.5	0.4
4/90	2	0.7	0.7	1.5	0.5	1.5	0.3
4/90	3	1.3	1	< 1.3	0.5	0.5	0.3
4/90	4	1.2	0.8	< 1.3	1.3	1.3	0.6
1/91 ^b	1						
1/91	2	1	1.3	3	0.8	3	0.4
1/91 ^b	3						
1/91 ^b	4						
2/91	1	2.1	1.2	4.6	2.3	2.3	0.8
2/91	2	1	0.7	< 1.1	0.7	0.7	0.4
2/91	3	1.5	0.8	< 1.3	0.8	0.8	0.5
2/91	4	1.3	0.6	< 1.4	1.2	1.2	0.6
3/91	1	3.6	< 0.2	< 0.5	0.7	1.0	< 1.1
3/91	2	1.7	< 0.2	0.6	0.3	0.7	< 0.7
3/91	3	2.6	0.2	< 0.5	0.6	1.8	< 0.9
3/91	4	3.8	0.2	0.5	0.8	1.6	1.8

^aSampling locations shown in Figure 2-1.

^bSample could not be obtained because of icy conditions.

Table 4-58
Summary of Metal Concentrations^a Detected in MISS Sediments
Fourth Quarter 1990 Through Third Quarter 1991

QTR/YEAR	SAMPLING LOCATION ^b	Ag	Al	As	B	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Tl	V	Zn
4/90	MISS-1	1.0UJ	3600	9.1J	26.1U	46.8B	0.26B	1290B	1.0U	3.2B	25.3J	12.7	6070	269B	26.1U	1010B	106	26.1U	78.1B	6.3B	26.1J	5.7U	0.52UJ	1.0UR	6.5B	49.8J
4/90	MISS-2	2.1J	1740	2.7J	16.7U	26.6B	0.23B	3290	0.67U	3.4B	5.3	35.1	5650	153U	16.7U	1890	94.8	16.7U	127B	10.7	71.5J	3.7U	0.38UJ	7.5UR	4.6B	197J
4/90	MISS-3	3.8J	4640	8.8J	27.1U	15B	0.38B	6460	2.7J	5.4B	21.2	91.8	11200	248U	27.1U	2520	182	27.1U	302B	20.3	395J	6.0U	0.50UJ	10.0UR	15.7	445J
4/90	MISS-4	0.9U	2700	32.2BJ	22.4U	68.4	0.29B	9390	1.1B	7.0B	41.6J	125J	28100	362BJ	22.4U	3540	316J	22.4U	196B	21.2	625	7.3B	0.34UJ	6.8UJ	1.3U	36B
1/91	MISS-1	2.7BJ	3620J	4.3	31.6U	82.2J	0.316U	3300	1.7J	4.5B	13.2J	50.4J	8350J	258U	31.6U	1570BJ	337J	31.6U	129B	8.6B	166J	6.65U	0.688J	7.1J	8.5B	176
1/91	MISS-2	3.0J	2940J	4.8	21.2U	34.5BJ	0.42B	6080	0.84BJ	7.0B	15.4J	7.0B	13500J	296B	21.2U	2610J	195J	21.2U	161B	25.0	100J	4.45U	0.47J	0.934UJ	9.4B	295
1/91	MISS-3 ^c																									
1/91	MISS-4 ^c																									
2/91	MISS-1	1.5B	3110	2.4	22.7U	102	0.227U	9160	1.7	5.9B	66.2J	88.3	21300J	388B	22.7U	3570	244	22.7U	286B	24.2	600	4.31U	0.338J	1.09UJ	3.6B	377
2/91	MISS-2	0.788U	1860	8.1	19.7U	36.0B	0.32B	12100	0.788U	4.5B	10.4J	43.2	7230J	198U	30.4	3490	209	19.7U	417B	10.6	122	3.74U	0.27BJ	0.957UJ	6.4B	161
2/91	MISS-3	0.963U	1450	3.4	24.8	49.9	0.241U	2780	0.963U	3.2B	10.6J	61.4	5560J	242U	49.9	1640	48.1	24.1U	649B	13.4	184	4.57U	0.227UJ	1.13UJ	2.5B	165
2/91	MISS-4	0.955U	75.5	4.1	23.9U	1.19U	0.239U	22.0U	0.955U	0.955U	0.716UJ	1.67U	8.83UJ	240U	23.9U	20.1U	0.477U	23.9U	16.9U	1.67U	77.8	4.54U	0.238UJ	1.19U	6.1B	0.716U
3/91	MISS-1	1.73U	1750	3.9J	24.8U	32.5J	0.25U	1230J	0.99U	2.3J	33.5	16.4	4690	226U	24.8U	685J	66.5J	24.8U	106J	5.4J	122J	13.63U	0.47U	0.47UJ	5.9J	69.9J
3/91	MISS-2	1.52U	2310	4.1J	21.7U	51.9	0.37J	5040	0.87U	4.2J	10.4	44.2	9100	207.1U	21.7	2740	216J	21.7U	164J	18.9	64.9J	11.93U	0.45U	0.45UJ	5.2J	231J
3/91	MISS-3	1.91U	2010	2.7J	27.3U	43.9J	0.52J	2540	1.1J	4.1J	13.4	67.9	8620	260.3U	27.3U	1430	72.5J	27.3U	165J	28.8	131J	14.99U	0.5U	0.5UJ	6.0J	326J
3/91	MISS-4	1.59U	2290	2.1J	22.7U	77.0	0.23U	11000	1.9J	5.7J	66.9J	98.8J	19500	397J	22.7U	3420J	306J	22.7U	261.9J	22.0	544J	12.47U	0.43U	0.43U	3.8J	391J

^aConcentrations are reported in units of mg/kg. Data qualifiers are:
U = analyte not detected above the listed detection limit.
J = result presented is an estimated value.
B = analyte detected below contract required detection limits and above instrument detection limits.
R = analysis results rejected due to QC problems.

^bSampling locations are shown on Figure 2-1.
^cNo sample.

Table 4-59
Summary of Rare Earth Concentrations^a in Sediments at MISS
Fourth Quarter 1990 Through Third Quarter 1991

Quarter/ Year	Sampling Location ^b	CERIUM	DYSPROSIUM	ERBIUM	EUROPIUM	GADOLINIUM	LANTHANUM	LUTETIUM	NEODYMIUM	PRASEODYMIUM	SAMARIUM	TERBIUM	TELLURIUM	THULIUM
		200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u
4/90	1	u	u	u	u	u	u	u	u	u	u	u	u	u
4/90	2	u	u	u	u	u	u	u	u	u	u	u	u	u
4/90	3	u	u	u	u	u	u	u	u	u	u	u	u	u
4/90	4	u	u	u	u	u	u	u	u	u	u	u	u	u
1/91	1	u	u	u	u	u	u	u	u	u	u	u	u	u
1/91	2	u	u	u	u	u	u	u	u	u	u	u	u	u
1/91	3 ^c													
1/91	4 ^c													
2/91	1	u	u	u	u	u	u	u	u	u	u	u	u	u
2/91	2	u	u	u	u	u	997	959	u	u	u	u	u	u
2/91	3	u	u	u	u	u	u	u	u	u	u	u	u	u
2/91	4	u	u	u	u	u	u	u	u	u	u	u	u	u
3/91	1	u	u	u	u	u	u	u	u	u	u	u	u	u
3/91	2	u	u	u	u	u	u	u	u	u	u	u	u	u
3/91	3	u	u	u	u	u	u	u	u	u	u	u	u	u
3/91	4	u	u	u	u	u	u	u	u	u	u	u	u	u

^aConcentrations are given in units of mg/kg. "u" values indicate concentrations that are below the detection limit, which is listed immediately below each analyte heading.

^bSampling locations are shown in Figure 2-1.

^cNo sample.

Table 4-60
Summary of Mobile Ion Concentrations^a Measured in Sediments at MISS

Sampling Location ^b	Chloride				Nitrate				Phosphate				Sulfate			
	Quarter/Year				Quarter/Year				Quarter/Year				Quarter/Year			
	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91	4/90	1/91	2/91	3/91
1	56	120	97.3	49.1	1	c	0.8	5.7	0.2	575	c	0.70	e	c	63.5	25.4
2	81	c	c	29.0	1	c	1	14.7	0.2	c	0.9	0.21	e	c	50.4	43.1
3	172	d	41	34.4	4	d	0.7	8.7	0.06	d	0.2	0.34	e	d	c	149
4	< 5.0	d	c	227	2	d	c	7.3	< 0.05	d	0.4	0.65	e	d	c	125

^aConcentrations in units of mg/kg.

^bSampling locations shown in Figure 2-1.

^cResult below analysis detection limits.

^dNo sample.

^eAnalysis not requested.

Table 4-61
Concentrations^{a,b} of Radon at MISS, 1990

Page 1 of 2

Sampling Location ^c	Quarter				Avg
	1	2	3	4	
Fenceline					
3	0.8	<0.3	<0.3	<0.2	0.4
4	0.9	0.6	<0.3	-- ^d	0.6
5	2.8	0.5	0.9	2.5	2
6	0.6	<0.3	<0.3	0.2	0.4
7	0.8	<0.3	<0.3	<0.2	0.4
8	<0.3	<0.3	<0.3	<0.2	0.3
9	<0.3	<0.3	<0.3	0.2	0.3
10	0.7	0.3	<0.3	0.3	0.4
11	<0.3	0.4	<0.3	0.2	0.3
12	<0.3	0.5	<0.3	<0.2	0.3
Onsite					
1	0.5	<0.3	<0.3	0.2	0.3
2	1.0	0.3	<0.3	<0.2	0.5
Quality Control					
13 ^e	1.1	0.4	<0.3	<0.2	0.5
15 ^{f,g}	0.9	0.3	<0.3	<0.2	0.4
16 ^{e,g}	<0.3	1.2	<0.3	<0.2	0.5
17 ^{f,g}	0.8	1.3	<0.3	<0.2	0.7
Background					
14 ^h	<0.3	<0.3	<0.3	-- ^d	0.3
18 ⁱ	0.4	0.5	<0.3	<0.2	0.4
19 ^j	<0.3	<0.3	<0.3	<0.2	0.3

^aConcentrations are given in units of pCi/L.

Note: 1 pCi/L is equivalent to 0.037 Bq/L.

^bBackground has not been subtracted from the values given for fenceline and onsite stations. Note: Several observed concentrations were below background concentrations.

^cSampling locations are shown in Figure 4-70.

^dDetector was damaged.

^eQuality control for station 1.

^fQuality control for station 2.

Table 4-61
(continued)

Page 2 of 2

^gStation added to the environmental monitoring program in 1990.

^hBackground detector located at the Department of Health,
Paterson, approximately 8.8 km (5.5 mi) west of MISS.

ⁱBackground detector located at the Rochelle Park Fire Station,
approximately 0.8 km (0.5 mi) northwest of MISS.

^jBackground detector located at the Rochelle Park Post Office,
approximately 0.8 km (0.5 mi) northwest of MISS.

Table 4-62
Trend Analysis for Concentrations^{a,b} of Radon at MISS, 1986-1990

Sampling Location ^c	Annual Average Concentration					Average Value	Standard Deviation	Expected Range ^d
	1986	1987	1988	1989	1990			
Fenceline								
3	1.2	1.5	0.6	0.4	0.4	0.8	0.4	0 - 2
4	1.6	1.1	1.9	0.9	0.6	1	0.5	0 - 2
5	9.9	9.7	7.4	1.0	2	6	4	0 - 10
6	1.9	2.4	1.4	0.6	0.4	1	0.8	0 - 3
7	0.9	1.1	0.8	0.6	0.4	0.8	0.2	0.4 - 1
8	0.8	1.0	0.4	0.4	0.3	0.6	0.3	0 - 1
9	0.9	1.1	0.5	0.5	0.3	0.7	0.3	0.1 - 1
10	6.5	4.9	1.0	0.6	0.4	3	3	0 - 9
11	1.3	0.8	0.8	0.5	0.3	0.7	0.3	0.1 - 1
12	2.6	2.3	1.1	0.8	0.3	1	0.9	0 - 3
Onsite								
1	0.6	0.7	0.6	0.4	0.3	0.5	0.2	0.1 - 0.9
2	1.2	1.2	0.9	0.4	0.5	0.8	0.3	0.2 - 1
13 ^e	1.2	1.1	0.4	0.5	0.5	0.7	0.3	0.1 - 1
Background								
14 ^f	1.0	0.8	0.3	0.5	0.3	0.6	0.3	0 - 1
18 ^g	--	--	--	0.4	0.4	0.4	0	0.4 - 0.4
19 ^h	--	--	--	0.4	0.5	0.4	0	0.4 - 0.4

Note: Sources for 1986-1989 data are the annual environmental reports for those years (BNI 1987b, 1988j, 1989a, 1990b).

^aConcentrations are given in units of pCi/L. Note: 1 pCi/L is equivalent to 0.037 Bq/L.

^bMeasured background has not been subtracted from the values given for fenceline and onsite locations.

^cSampling locations are shown in Figure 4-70.

^dAverage value ± 2 standard deviations.

^eStation 13 is a quality control for station 1.

^fBackground detector located at the Department of Health, Paterson, approximately 8.8 km (5.5 mi) west of MISS.

^gBackground detector located at the Rochelle Park Fire Station, approximately 0.8 km (0.5 mi) northwest of MISS. Established in April 1988.

^hBackground detector located at the Rochelle Park Post Office, approximately 0.8 km (0.5 mi) northwest of MISS. Established in April 1988.

Table 4-63
Average External Gamma Radiation Exposure Rates^{a,b}
at MISS, 1990

Page 1 of 2

Sampling Location ^c	Quarter				Average
	1	2	3	4	
Fenceline					
3	21	13	20	10	16
4	84	74	82	-- ^d	80
5	147	136	118	155	139
6	66	-- ^d	50	45	54
7	1	30	7	0	10
8	12	10	12	6	10
9	12	13	12	0	9
10	164	138	160	136	150
11	30	26	34	32	31
12	72	81	80	96	82
					Average <u>58</u>
Onsite					
1	29	17	34	17	24
2	36	25	28	32	30
					Average <u>27</u>
Quality Control					
13 ^e	22	25	23	15	21
15 ^{f,g}	33	24	32	24	28
16 ^{e,g}	24	22	28	22	24
17 ^{f,g}	44	42	38	41	41
					Average <u>29</u>
Background					
14 ^h	64	67	58	-- ^d	63
18 ⁱ	71	66	59	58	64
19 ^j	84	76	70	81	78
					Average <u>68</u>

^aExposure rates are given in units of mR/yr.

^bAverage annual background has been subtracted from readings taken at the fenceline and onsite sampling stations.

^cSampling locations are shown in Figure 4-70.

^dTETLD missing.

^eQuality control for location 1.

^fQuality control for location 2.

^gStation added to the environmental monitoring program in 1990.

Table 4-63
(continued)

Page 2 of 2

^hBackground detector located at the Department of Health, Paterson, approximately 8.8 km (5.5 mi) west of MISS.

ⁱBackground detector located at the Rochelle Park Fire Station, approximately 0.8 km (0.5 mi) northwest of MISS.

^jBackground detector located at the Rochelle Park Post Office, approximately 0.8 km (0.5 mi) northwest of MISS.

Table 4-64

Trend Analysis for External Gamma Radiation Exposure Rates^{a,b} at MISS, 1986-1990

Sampling Location ^c	Annual Average Rate					Average Value	Standard Deviation	Expected Range ^d
	1986	1987	1988	1989	1990			
Fenceline								
3	38	29	21	29	16	27	7.6	12 - 42
4	91	69	109	112	80	92	16	60 - 120
5	172	121	186	154	139	154	23	110 - 200
6	83	67	85	68	54	71	11	49 - 93
7	24	36	16	13	9	20	10	0 - 40
8	18	37	30	9	10	20	10	0 - 40
9	23	39	32	17	9	20	10	0 - 40
10	496	521	317	173	150	331	156	19 - 643
11	50	61	59	35	31	47	12	23 - 71
12	88	79	106	90	82	89	9.4	70 - 110
Onsite								
1	41	36	40	28	24	34	6.7	21 - 47
2	51	43	52	35	30	42	8.7	25 - 59
13 ^e	35	33	39	27	21	31	6.3	18 - 44
Background								
14 ^f	63	58	78	63	63	65	6.8	51 - 79
18 ^g	--	--	--	64	64	64	0	64 - 64
19 ^h	--	--	--	56	78	67	11	45 - 89

Note: Sources of data for 1986-1989 are the site environmental reports for those years (BNI 1987b, 1988j, 1989a, 1990b).

^aExposure rates are given in units of mR/yr.

^bAverage quarterly background has been subtracted from fenceline and onsite readings.

^cSampling locations are shown in Figure 4-70.

^dAverage value ± 2 standard deviations.

^eStation 13 is a quality control for station 1.

^fBackground detector located at the Department of Health, Paterson, approximately 8.8 km (5.5 mi) west of MISS.

^gBackground detector located at the Rochelle Park Fire Station, approximately 0.8 km (0.5 mi) northwest of MISS. Established in April 1988.

^hBackground detector located at the Rochelle Park Post Office, approximately 0.8 km (0.5 mi) northwest of MISS. Established in April 1988.

5.0 CONTAMINANT FATE AND TRANSPORT

This section describes the fate and transport of contaminants on the MISS portion of the Maywood Site. Generally, the description reflects current conditions and is based on the interpretation of data collected to characterize and monitor MISS.

Of all the operable units at the Maywood Site, MISS contains the most significant levels of contaminants. The types of contaminants and the soil properties are fairly similar across the site; therefore, results of the MISS analyses may be applied to the other properties. The vicinity properties have only low levels of contamination from sediment deposition and do not constitute a significant source. A partial description of the interrelationship between conditions at the MISS and Stepan properties is provided.

Contaminant concentrations are not likely to change significantly over the next several years (on the order of tens of years); therefore, steady state is assumed. Where data indicate future trends, these are noted; however, quantitative predictions, which require modeling, are not attempted. The baseline risk assessment will evaluate the risk posed by the Maywood Site to human health and the environment based on the current conditions.

Two primary factors influence contaminant release and migration from MISS:

- The physical and chemical properties of the contaminants themselves
- The physical characteristics of the site (e.g., topography, geology, hydrology, meteorology, man-made structures)

Section 5.1 discusses the physical and chemical properties of the primary radionuclides and chemicals and how these properties affect contaminant fate and transport. Section 5.2 integrates information on contaminant sources, site topography, geology, and hydrology to develop a conceptual model of potential contaminant migration pathways. Contaminant release mechanisms and transport media are also described in this section. Section 5.3 describes

the fate and transport of the detected contaminants in the principal media. Section 5.4 summarizes conclusions drawn from the data.

5.1 PHYSICAL AND CHEMICAL PROPERTIES

Both radioactive and chemical contaminants are present in soil at MISS and in the burial sites at Stepan. The radionuclides of interest are thorium-232 (the principal contaminant), radium-226, uranium-238, thoron, and radon. Several metals, rare earths, and organic compounds are also found at concentrations above background levels. These contaminants are summarized in Tables 4-20 through 4-23.

5.1.1 Radionuclides

The important properties that govern radionuclide fate and transport are radioactive decay rate, solubility, and sorption in soils. Table 5-1 presents the half-lives and distribution coefficients of radium-226, uranium-238, and thorium-232. Table 5-2 gives the distribution coefficients of thorium and uranium in various types of soil and under various pH conditions. The pH readings in groundwater generally ranged from 6.5 to 9.5, although higher pH values were occasionally observed. Radon (half-life of 3.8 days) and thoron (half-life of 55 s) are gases and are emitted from soil largely by gaseous diffusion.

A half-life is the time it takes for half of any given quantity of a radionuclide to disintegrate. Most of the radionuclides of interest at the Maywood Site (except thoron and radon) have half-lives greater than 1,600 years and, therefore, are very stable.

The distribution coefficient (adsorption coefficient) relates radionuclide concentration in water to that in soil. A linear, equilibrium relationship is assumed:

$$C_s = K_d C_w$$

where: C_w = concentration in water,
 K_d = distribution coefficient, and
 C_s = concentration in soil.

This linear relationship is generally valid under low water concentration conditions (about 1 ppm or less), similar to those found at the Maywood Site. A high distribution coefficient means a higher radionuclide concentration in soil relative to its concentration in water. High K_d also implies slower migration. Because the three primary radionuclides at Maywood (especially thorium) have high K_d values, they would be predicted to have low aqueous concentrations and should be slow to migrate.

Soluble compounds can dissolve in water and be transported, although the transport rate will be affected by soil adsorption. The solubility products of some of the sparingly soluble compounds detected at MISS (including radium, uranium, and thorium) are presented in Table 5-3. Chlorides and nitrates are highly soluble; hydroxides, carbonates, and sulfates (with the exception of thorium sulfates) are only sparingly soluble.

The groundwater at MISS has significant levels of chloride, nitrate, and sulfate ions as well as naturally occurring ions such as the pH-dependent hydroxyl ion and the carbonate ion (depending on the presence of certain rock types). Thus, sparingly soluble radionuclide compounds such as carbonates, hydroxides [e.g., $\text{Th}(\text{OH})_4$], and sulfates can form. The formation of insoluble compounds limits the concentration of radionuclides in solution, thereby limiting their migration.

5.1.2 Chemicals

Chemicals detected on MISS include metals, rare earth elements, and organics. Metals and rare earth elements are substances that preserve their total mass and do not undergo degradation; however, they can be transported in the environment. They are also subject

to chemical transformation or speciation, which can influence mobility by controlling solubility and adsorption in soils. Most metals do not readily volatilize.

Distribution coefficients of some of the metals are presented in Table 5-4. Metal cations principally adsorb on negatively charged clay surfaces (electrostatic effect). In addition, ions can be chemically bound to adsorption surfaces. Adsorption coefficients account for all binding effects. Many metals (e.g., copper) also bind strongly to organic material.

The solubility product (SP) for the dissociation (dissolution) of a compound ($\text{MX(s)} \rightleftharpoons \text{M}^+ + \text{X}^-$) is defined as

$$SP = [M^+][X^-]$$

where: MX(s) = solid compound,
 $[M^+]$ = activity (concentration) of M^+ metal ions ($\frac{\text{mol}}{\text{L}}$),
and
 $[X^-]$ = activity (concentration) of X^- anions ($\frac{\text{mol}}{\text{L}}$).

The lower the solubility product, the less soluble the compound. The solubility of the metals varies depending on the pH and the concentrations of major ions present in the water. At increased concentrations of either the metal ion or anions (CO_3^{2-} , SO_4^{2-} , OH^-), a sparingly soluble compound will precipitate. For example, thorium hydroxide (solubility product = 3.2×10^{-45}), along with other insoluble compounds, is likely to have formed when the original thorium wastes came in contact with the groundwater environment. Also, barium sulfate [BaSO_4 (solubility product = 1.1×10^{-10})] is likely to precipitate. Of the compounds that are most likely to form, usually the chlorides, nitrates, and nitrites are the most soluble; whereas sulfates, carbonates, and hydroxides have low to moderate solubility. As discussed in Section 5.1.1, soluble compounds are dissolved in water and transported subject to adsorption (a compound has to be soluble to adsorb). An insoluble compound will remain as a precipitate and limit the overall dissolution of the metal.

The organic contaminants found at MISS include VOCs and BNAEs.

The organic compounds are mobilized by dissolution, volatilization, and diffusion. They also partition to the soil matrix.

Volatilization is generally defined as the loss of a chemical into the air from a liquid phase or water solution. Diffusion is a molecular phenomenon in which molecules move from a zone of higher concentration to one of lower concentration. Diffusivity governs gaseous transport through the soil pore spaces. The Henry's Law constant and vapor pressure govern the volatilization of the organics. The greater the Henry's constant and vapor pressure, the greater the volatilization. The organic carbon-based water partition coefficient (K_{oc}) is a measure of the adsorption affinity of the compounds for organic material. The soil-water partition coefficient (K_p), which is equivalent to the distribution coefficient (K_d), is related to K_{oc} by

$$K_p = f_{oc} K_{oc}$$

where: K_p = soil-water partition coefficient, and
 f_{oc} = soil organic carbon content as mass fraction.

Organic compounds, which are largely nonpolar, adsorb preferentially to organic matter; therefore, the partition coefficient is a function of organic or humic material content of soil. Table 5-5 lists the molecular weight, solubility, Henry's Law constant, vapor pressure, and K_{oc} of the organic compounds found on MISS. Table 5-6 presents the diffusivity in air of some of the organic compounds.

Organic compounds undergo both biological and chemical transformation, which can be affected by such factors as soil pH and oxygen content. Organic degradation and chemical oxidation are facilitated by the higher oxygen content in the vadose zone. Certain classes of organic compounds undergo chemical hydrolysis [reactions resulting in the net exchange of a hydroxyl group (OH^-) with some other group]. The rate of hydrolysis is frequently directly related to pH. Soil moisture content also affects

transformation of organic compounds because the presence of water is required for hydrolysis and for microbial metabolism. It is usually difficult to estimate the individual rates of these processes. In the mathematical treatment of transformation, all processes are combined to derive a single site-specific value for the rate of degradation. The estimated half-life ranges for selected organic compounds (in the soil and groundwater) are given in Table 5-7.

5.2 SITE CONCEPTUAL MODEL

The process of contaminant migration involves a source, a release mechanism, and a transport medium for migration from the point of release to the point of exposure. Primary contaminant sources are discussed in detail in Section 4.3 and are summarized in this section. The mechanism for releasing compounds into the environment depends on the source, the contaminant, environmental factors, and the media to which the contaminant is released. Groundwater, surface water, and air are the primary transport media at MISS.

Figure 5-1 depicts the conceptual site model illustrating potential sources, primary release mechanisms, environmental transport media, and principal exposure routes. In addition to exposure via groundwater, surface water, and air, exposure may occur through direct contact with the source. Human proximity to radioactively contaminated sources lacking effective barriers will result in direct gamma radiation exposure.

5.2.1 Sources

The primary sources of contamination identified were (1) burial pits 1, 2, and 3 at Stepan, (2) former retention ponds on the MISS, Sears Distribution Center, and Ballod properties, and (3) the interim storage pile at MISS (see Figure 4-9). The burial pits are potentially a major source of contaminants, and their impact on the groundwater will be evaluated with the installation of new wells on

the Stepan property. The retention ponds are no longer active and are now covered with fill material, vegetation, and artificial surfaces (asphalt or concrete). Potential migration pathways from these former ponds include surface water runoff, air emission, and leaching into the groundwater system. The MISS storage pile is not considered a source for the groundwater pathway because it is engineered to be hydrologically isolated and is covered. However, the pile is a potential source for surface runoff, air emissions, or groundwater contamination should the cover or bottom liner be compromised.

5.2.2 Release Mechanisms

The primary mechanisms of release from the identified sources are percolation and subsequent leaching to groundwater, gaseous and airborne particulate emission, and surface runoff.

Percolation and subsequent leaching

Excess precipitation (after surface runoff and depression storage) infiltrates into the ground surface. Some of the infiltrating water is lost to evapotranspiration, and the rest percolates down into the shallow unconsolidated and deeper bedrock saturated zones. The rate of percolation is controlled by soil cover, ground slope, saturated conductivity of soil, and meteorological conditions (which affect evapotranspiration). The percolation rate calculated for the site (Section 3.3.3) is 36.1 cm/yr (14.2 in./yr). Areas covered by concrete pads or buildings are not considered to have water percolating through the soil; however, deterioration of the structures could lead to leaching of the soil beneath the structures in the future. As previously noted, the MISS pile is engineered to be hydrologically isolated, and it is unlikely that leaching will occur.

Water infiltrating through contaminated surface and subsurface soils may leach contaminants into the groundwater. The factors that affect leaching rate include a contaminant's solubility and

partition coefficient and the amount of percolation. The partition coefficient or solubility may be important depending on whether leaching is solubility-controlled or sorption-controlled.

Highly insoluble compounds [e.g., $\text{Th}(\text{OH})_4$, BaSO_4 , and many arsenates] are likely to precipitate out or remain in their insoluble form with little leaching. Because most of the contaminants identified as FUSRAP waste are present at trace levels, they are likely to remain below their solubility limits and, therefore, are subject to adsorption onto the soil matrix. Contaminants with low distribution coefficients undergo greater leaching.

Gaseous and particulate emission

Volatile organics in surface soil may escape to the air via vaporization. The rate of such emission is controlled by the vapor pressure of the organic compounds in the surface soil. This emission decreases rapidly over a short time as the volatiles in the surface soil layer are released to the atmosphere. Volatile organics in subsurface soils may contribute to gaseous emission over a longer time via vertical diffusion through the soil pores. These gaseous emissions from the subsurface soils may be significant.

Particulate emission from contaminated surface soil occurs via wind erosion, which is controlled by vegetative cover, wind speed, and moisture in the surface soils. Wind erosion at MISS is not expected to be significant because the ground surface is predominantly paved or covered with grass.

Surface runoff

The contaminants that are sorbed onto surface soils can be released by dissolution in surface runoff or by sheet erosion during a rainstorm. Sheet erosion is not expected to be an important release mechanism at the site because ground surfaces are primarily paved or grass-covered; this prediction is substantiated

by the low levels of contamination, which includes several VOCs and metals detected in the drainages downstream of the site.

5.2.3 Transport Media

Transport media at the Maywood Site are groundwater (including subsurface water in the vadose zone), surface water and sediment, and air, which are described in Sections 3.5, 3.3, and 3.2, respectively. Because a significant portion of the contamination is currently confined to the vadose zone, only small amounts of contaminants are expected to migrate (under current conditions) in any of the environmental media. However, the potential exists for substantially increased migration in groundwater if the contaminants, especially radionuclides, reach groundwater in significant amounts.

Groundwater

Water infiltrating through contaminated soil travels downward in the vadose zone, carrying leached contaminants with it. The velocity of the vertical unsaturated flow and the vertical hydraulic conductivity (which control the percolation rates) are a function of soil moisture content. The maximum vertical flow is equal to the saturated hydraulic conductivity. The saturated hydraulic conductivity and the maximum soil moisture content of various soil types are given in Table 5-8. Contaminants move vertically downward through the vadose zone at retarded velocities due to sorption.

As described in Section 3.4.2, the upper unit of the unconsolidated soil zone consists of a mixture of sand, silt, and gravel; the lower unit in the unconsolidated zone consists of silt and sand. The middle unit consists of clayey material. The mixture of clayey material, silt, and sand offers moderate cation exchange capacity and cation adsorption. Urban fill was found in most areas. Some of the areas of urban fill in the upper and middle layers show high organic content and represent a potential

for increased adsorption of organic compounds. Many metals (such as copper) also bind strongly to organic matter.

When the contaminant reaches the groundwater, it may be transported in the groundwater system by the bulk groundwater flow (advective transport), diffusion/dispersion, and/or colloidal particulate suspension, with advective transport being the most effective means of contaminant movement. Groundwater flow occurs in both the shallow unit and the deeper unit (Section 3.5.2). Shallow groundwater flow occurs in the unconsolidated sediments, while the deeper groundwater flow is in the weathered bedrock. The shallow unconsolidated groundwater flow is predominantly to the west, with an average hydraulic gradient of 0.01 (Figures 3-23 and 3-25). The average linear flow velocity is about 6.1 m/yr (20 ft/yr). The thickness of the flow unit ranges from approximately 0.6 to 4.6 m (2 to 15 ft) (see Section 3.5.2). The bedrock flow unit has an average gradient of 0.011 and an effective porosity of 0.01 to 0.05 in the fractured rocks. The linear velocity ranges from 51 to 257 m/yr (168 to 842 ft/yr) in a westerly direction (Figures 3-24 and 3-26).

The burial pits (especially burial pit 2) extend to bedrock and are likely in contact with the groundwater. Some portion of the groundwater aquifer under the Stepan property is upgradient of the MISS groundwater system; therefore, there is a potential for groundwater contaminants (especially from burial pits 1 and 2) to migrate from Stepan to MISS. Data currently being collected for the Stepan RI will provide information on contaminant transport from the burial pits. Monitoring wells MISS-4B, MISS-3B, and B38W03B show low levels of metal and VOC contamination, but because of their distance [approximately 200 m (650 ft)] from the burial pits, it is not possible to correlate contamination in these wells with these sources.

Contaminant transport can be enhanced by fractures in the bedrock. A small vertical downward gradient exists throughout most of the site (see conceptual groundwater flow system, Figure 3-27), allowing a certain amount of vertical contaminant transport, which is further facilitated by the presence of vertical fracture zones

in certain areas.

Contaminant velocity is also subject to retardation (R_d) similar to that in the vadose zone. The retarded advective transport velocity of a contaminant is given by the equation:

$$V_c = \frac{V}{R_d}, \quad \text{where: } V_c = \text{velocity of contaminant (m/day),}$$
$$V = \text{average linear velocity (m/day), and}$$
$$R_d = \text{retardation factor.}$$

The higher the distribution coefficient, the greater the retardation factor.

Surface water

Because MISS is well vegetated or covered by impervious surfaces, movement of suspended particles in surface runoff is expected to be minimal. Most of the contamination is in the subsurface soil; therefore, the potential for substantial surface migration is small.

Westerly Brook drains the MISS waste pile and portions of the Stepan property. The brook is channelized through a culvert at MISS (Figure 3-2). Portions of Stepan, Sears, and nearby properties drain southward into Lodi Brook and its tributary. Lodi Brook, which is now redirected through culverts for most of its length, has diminished potential for surface water transport.

Air

The vapor phase concentration of organic compounds is controlled by the distribution coefficient K_p , Henry's constant, and (to some extent) soil moisture content. The distribution coefficient of radon is not readily available; its water solubility is relatively low (maximum solubility 10 mmol/L).

The vapor phase constituents are transported to the air at the soil surface by slow diffusion. Radon, which is present in gaseous

form, also migrates by diffusion. The effective diffusion coefficient, which accounts for porosity and soil moisture content, governs this transport.

Fine particulates are transported and deposited on the ground at varying distances from the site depending on particle size. The very fine particles and gaseous compounds are dispersed in the air, where their concentrations depend on wind speed, distance from source, and atmospheric conditions affecting dispersion. Most of the contaminants are in the subsurface soil, and there is little potential for particulate transport because of the grass and concrete covering at MISS and Stepan.

5.2.4 Intermedia Transfer

In addition to contaminant transport in environmental media, mass transfers occur from one medium to another. These intermedia transfers are considered to be secondary release mechanisms. Figure 5-2 shows the processes involved in intermedia transfer.

The principal intermedia transfer at the Maywood Site is between soil and water; soil contaminates water via dissolution and desorption, while water transfers contaminants to soil via sorption. In addition, volatilization and resuspension from land surfaces and volatilization from surface water may occur, transferring contaminants into the air. However, there is no measurable evidence that deposition and precipitation from air are occurring at the site. Groundwater and surface water interact via seepage and groundwater discharge (in this case to the Saddle River). At present, there is no indication of contaminant movement via groundwater from MISS into the Saddle River.

5.3 CONTAMINANT FATE AND TRANSPORT IN THE PRINCIPAL MEDIA

This description of contaminant fate and transport in the principal media (soils, groundwater, surface water and sediment, and air) at MISS is based on the conceptual model discussed in Section 5.2. The contaminants observed in transport media are not

traceable to any specific sources such as the retention ponds or burial pits.

5.3.1 Soils and Groundwater

Radionuclides

The vadose zone and some of the surface soils contain elevated concentrations of radium-226, uranium-238, and thorium-232 (BNI 1987a); with few exceptions, radionuclides are detected to a depth of 3 m (10 ft). In the area east of Building 76 and in some areas in the central and northwestern portions of MISS, the peak radionuclide concentrations occur at depths of 1.8 to 2.4 m (6 to 8 ft). The various radionuclides have very different K_d values and should migrate at different rates. There has been no noticeable change in depth of the peak concentrations of the three radionuclides, implying that there has been no significant migration in the soil column.

If sorption is modeled as a linear equilibrium process, the retardation factor is given by

$$R_d = 1 + \frac{\rho_b K_d}{n\Theta},$$

where: R_d = retardation factor (unitless),
 K_d = distribution coefficient (cm^3/g),
 ρ_b = bulk density (g/cm^3),
 Θ = volumetric moisture content (unitless), and
 n = porosity in saturated flow (unitless).

The radionuclides of interest at the Maywood Site (thorium-232, uranium-238, and radium-226) have high distribution coefficients (see Table 5-1). The distribution coefficient is quite sensitive to the pH of the transporting water as well as to the type of soil through which the contaminants move (as illustrated in Table 5-2). Groundwater pH varies from about 6.3 to 8.5. Using typical values for bulk density [ρ_b ($1.8 \text{ g}/\text{cm}^3$)] and porosity (0.3) and a

conservatively low distribution coefficient of 50 for thorium-232 (the most prevalent contaminant at the site), a retardation factor of about 300 can be calculated. The retardation factor in the vadose zone would likely be even higher because the volumetric moisture content is less than the porosity. Based on an average velocity of 36.1 cm/yr (14.2 in./yr) in the vadose zone (see Section 3.3.3), a conservatively low value of 0.2 for effective porosity (Section 3.5.2), and a retardation factor of 300, thorium-232 would migrate 0.3 m (1 ft) in 50 years in the vadose zone. Similar values would be obtained for uranium and radium. While these numbers are rough estimates, they clearly indicate that the principal radioactive contaminants that are currently in the upper vadose zone will not reach the groundwater for a long time. However, because of their long half-lives, these radionuclides remain potential sources of future groundwater contamination.

The groundwater table is at depths of 1.8 to 3.7 m (6 to 12 ft) during low water season and 1.5 to 3.4 m (5 to 11 ft) during wet season. Greater fluctuations occur during periods of actual rainfall. Thus, some of the deeper contaminated soils (e.g., around Building 76) are submerged in groundwater for varying periods of time.

With a mean groundwater velocity of 6.1 m/yr (20 ft/yr), and assuming a retardation factor of 300 ($K_d = 50 \text{ cm}^3/\text{g}$, $P_b = 1.8 \text{ g/cm}^3$, $n = 0.3$), the radionuclide plume would have traveled only 0.3 m (1 ft) in 15 years. Groundwater flow in bedrock (on which some burial pits rest) ranges from 26 to 131 m/yr (86 to 430 ft/yr). This corresponds to a radionuclide travel velocity of 0.085 to 0.44 m/yr (0.3 to 1.4 ft/yr). Thus, even with some submerged soil contaminants, the radionuclide flux is expected to be small due to the high K_d values of the contaminants. The concentrations of radium, uranium, and thorium in groundwater were comparable to background levels. At a shallow monitoring well (MISS-4A), the thorium-232 concentration slightly exceeded background (2 pCi/L, or 0.07 Bq/L). This well frequently did not contain water and should not be considered representative of general groundwater conditions.

Radium and uranium have a lower partition coefficient than thorium

and are therefore likely to be present at slightly higher concentrations in the pore water in the contaminated soil zone.

The higher-than-background concentrations (6 to 10 pCi/L) in offsite wells B38W14S, B38W14D, and B38W17A may reflect localized sources in the deeper soils. It should be noted that all of the reported concentrations are significantly (an order of magnitude) below DCGs (Section 4.8). The estimated travel time for the radionuclides is too great to expect them to have moved to the offsite well locations, which are more than 183 m (600 ft) away.

Chemicals

Metals were detected at concentrations above background in many boreholes at a shallow depth [less than 1.8 m (6 ft)] in areas near Building 76, around the storage pile, and west of the pile. Areas north of the tank also show substantial metal contamination (locations of chemical boreholes are shown in Figure 4-27). In addition, some boreholes in these areas show metal contamination extending to a depth of 3.7 m (12 ft). Because the groundwater table fluctuates between 1.5 and 3.7 m (5 and 12 ft) in depth, large zones of metal-contaminated soils are in direct contact with the groundwater. Detected metals are listed in Table 4-20. Of these metals, arsenic, chromium, copper, lead, lithium, and selenium were the most prevalent and were identified as FUSRAP waste constituents in soil (Sections 4.4 through 4.7). Antimony, barium, boron, beryllium, cadmium, cobalt, nickel, silver, vanadium, and zinc were also detected at above-background levels. The primary rare earth elements detected in soil were cerium, lanthanum, and neodymium.

The fate and transport of metals are influenced by the extent of their presence in the soil and by their physical and chemical properties. Among the metals identified as FUSRAP waste, arsenic, lithium, copper, and zinc are generally expected to be most mobile and may be expected to migrate. In addition, boron, chromium, lead, and other metals were detected with regularity in the groundwater.

The fate and transport of specific key metals and rare earth elements are discussed below.

Lithium. Lithium was present at relatively high levels (17.4 mg/kg to 2,290 mg/kg) in site soils. Lithium is an alkali metal and can be expected to have properties similar to those of other alkali metals. The common compounds of lithium such as LiCl and LiOH are fairly soluble in water; Li_2CO_3 is also slightly soluble (Table 5-3). Thus, the transport of lithium is not likely to be solubility-controlled.

Although a relatively high K_d is shown for lithium in Table 5-4, the value of K_d for lithium is highly dependent on pH and the presence of other major ions (especially other monovalent cations). Gast (1969) suggested that lithium adsorbs less strongly than most other cations (such as Na and K); because of the large radius of its hydrated ions, lithium can be expected to be quite mobile. Elevated levels of lithium are observed in many groundwater wells; however, at this time, no conclusions can be drawn regarding the migration of lithium across the site boundary.

Additional offsite wells (as defined in the proposed field sampling plan) near the boundary will help determine such migration.

Arsenic. Arsenic is widespread in site soils, with higher concentrations detected around the storage pile. Concentrations of arsenic in soil range from 0.53 to 1,060 mg/kg. Because arsenic can occur in four stable oxidation states (+5, +3, 0, 3), it has an unusually complex chemistry. The oxidation state of arsenic is determined by the redox potential (Eh) of the environment; a high redox potential indicates an oxic (high oxygen) environment. Given the relatively high Eh due to shallow groundwater and local recharge, H_3AsO_3 , H_2AsO_3 , and H_3AsO_4 will be the more prevalent species and will tend to keep arsenic in solution. Arsenic is removed from solution either by adsorption onto clay or by coprecipitation into metal ion precipitates. At high pH, arsenic forms insoluble arsenate salts with Mn^{2+} , Ni^{2+} , or other alkaline cations (Table 5-3). Anionic adsorption of arsenic on oxide surfaces is highly pH-dependent and is strongest between pH 5 and

pH 7 (Anderson et al. 1976); the adsorption coefficient (K_d) is relatively low (Table 5-4). Most of the wells containing arsenic (e.g., MISS-2A and MISS-3A) are in areas that have soils contaminated with arsenic. Except for well MISS-7B, none of the wells downgradient of the areas with contaminated soils exhibits elevated arsenic concentrations. Although somewhat mobile, arsenic does not appear to be migrating currently and is unlikely to cross the MISS boundary in the next several years because of the low groundwater linear velocity. An approximate K_d value of $3 \text{ cm}^3/\text{g}$ (Table 5-4) gives a retardation factor of 20 ($P_b = 1.8 \text{ g}/\text{cm}^3$, $n = 0.3$), which implies that arsenic is transported at a relatively slow rate (0.5 m/yr). This is a conservative value; other studies (Pierce and Moore 1982) show that arsenates bind much more strongly to metal hydroxide surfaces. The default value of K_d adopted for use in the computer code TERRA is $200 \text{ cm}^3/\text{g}$ (Baes et al. 1984).

Barium. Barium is widespread in MISS soil, with concentrations ranging from 15.3 to 310 mg/kg. The relative abundance of sulfate ions in the groundwater (see Table 4-47) enhances the formation of barium sulfate (which is inherently highly insoluble) and restricts migration. Barium ions are readily adsorbed because of the small radius of the hydrated ions but can migrate as fine colloids. Small quantities of barium have been detected in some onsite (e.g., MISS-5A) and offsite wells.

Beryllium. Beryllium is present at low levels, primarily in the soils around the waste pile and Building 76. The estimated K_d for beryllium used in the TERRA code is high (Baes et al. 1984). This value, however, is more pertinent to adsorption onto organics.

Beryllium is an alkaline earth metal and, based on properties of similar metals, is likely to have a low adsorption coefficient on clays and soils. $\text{Be}(\text{OH})_2$ is sparingly soluble and could limit beryllium solubility. Mobility is expected to be pH-dependent and to be relatively high at below-neutral pH. The beryllium concentration in groundwater is low, reflecting the low concentration of beryllium in soil.

Cadmium. Small amounts of cadmium are present in various areas at MISS. Cadmium is present at relatively low levels in the soil.

Most cadmium compounds are fairly soluble; the solubility of cadmium is usually limited by its occurrence as CdCO_3 . $\text{Cd}(\text{OH})_2$ is slightly soluble at neutral pH (Table 5-3). Cadmium generally binds more strongly to humic material than to inorganic matter (Suzuki et al. 1979) and has a low adsorption coefficient (Table 5-4). Although cadmium may be fairly mobile, it was detected in only one of the downgradient wells, suggesting the absence of a major source.

Chromium. Chromium is widespread in the soils around the storage pile and Building 76. Trivalent chromium is normally not very soluble (Table 5-3). Chromium is more strongly adsorbed in soil than copper or zinc (King 1988), both of which have a K_d of 20 (Table 5-4). Thus, chromium has a relatively high K_d and is not very mobile. Although hexavalent chromium is highly soluble (Table 5-3) and has a low K_d (Table 5-4), it is not very stable in the environment, and the trivalent species is likely to predominate.

Elevated chromium levels are observed in shallow well MISS 2A, which is situated near a zone with elevated levels of chromium contamination in soil. The offsite wells also exhibit relatively high concentrations of chromium, which are postulated to have originated from local offsite sources, given the low migration rate.

Copper. Copper is quite widespread in MISS soils. The hydroxide [$\text{Cu}(\text{OH})_2$] precipitates above pH 6, and CuCO_3 is sparingly soluble (Table 5-3). Copper adsorbs strongly to clays and humic material (Oakley et al. 1981), which could also restrict its mobility. However, copper readily complexes with organic liquids to remain in soluble or colloidal form, which may explain its presence in several groundwater wells (MISS-2A, MISS-4A, and MISS-6A) and some offsite wells. No definitive offsite migration can be identified from the available data.

Nickel. Moderate levels of nickel (ranging from 2.8 to 135 mg/kg) are present near the waste pile, in the vicinity of Building 76, and in the area north of the tank. Because of its high adsorption coefficient (Table 5-4) and low solubility

(Table 5-3), it is not present at significant levels in onsite wells. The nickel contamination observed in some of the offsite wells could be explained by their proximity to offsite contaminated soil zones.

Lead. High levels of lead (2.2 mg/kg to 580 mg/kg) are observed in soils in most areas at MISS. The primary form of lead in aqueous solution is the Pb (II) species. Further, lead readily adsorbs to clayey material; it has an average K_d of 100 cm³/g in clay soils (Table 5-4). The predominant species, lead carbonate, lead hydroxide and lead sulfate, have very low solubility; therefore, lead is not expected to migrate significantly unless it moves as an inorganic colloid. The few wells in which lead was detected could be near contaminated soils.

Selenium. Selenium in soil is found mainly north of the storage pile and east of Building 76 at concentrations ranging from 0.41 to 3.40 mg/kg. Little data on selenium speciation are available. Selenates and selenites are the more soluble and mobile forms. These species predominate under aerobic conditions at neutral to high pH (Shamberger 1981). Selenium has a low adsorption coefficient (Table 5-4) and forms complexes with organics (Measure and Burton 1978). Under acidic and low aerobic conditions, selenite can bind strongly to metal hydroxide surfaces in soil. In soils and sediments, selenium can be methylated by microorganisms and subsequently volatilized to the atmosphere. The small amounts of selenium found in wells MISS-6A and MISS-6B may have originated underneath the storage pile.

Antimony. Small quantities of antimony are found in the soils around the storage pile and east of Building 76. Although its adsorption coefficient has never been thoroughly researched, antimony can be expected to have a binding affinity for clayey soils. A K_d value of 45 has been estimated for use in the computer code TERRA (Baes et al. 1984). Only wells MISS-2A and MISS-2B show small quantities of antimony. Antimony is also found in all the offsite wells (B38W14S, B38W14D, B38W15D, and B38W17A). Additional sampling wells would help to determine conclusively whether the detection of antimony in these wells reflects offsite migration

from MISS.

Vanadium. Vanadium is observed largely in soil near Building 76, at concentrations ranging from 1.8 to 30.6 mg/kg. Vanadium has a high adsorption coefficient (Table 5-4) and low solubility (Table 5-3) and would not be expected to migrate significantly. Vanadium binds strongly with organics, manganese oxides, and ferric hydroxides (Wehrli and Stumm 1989), especially under acidic and saturated conditions. The groundwater wells show scattered values for concentrations of vanadium.

Zinc. Zinc is present in MISS soils around and south of the storage pile and around Building 76. $ZnCO_3$ and $Zn(OH)_2$ are slightly soluble. Zinc adsorbs strongly to clay; the average distribution coefficient in clay soils is given as $20 \text{ cm}^3/\text{g}$ (Table 5-4). Zinc also binds with organic matter (Ardhakanie and Stevenson 1972). The mobility of zinc decreases greatly with an increase in pH. At pH 6 to 8, zinc is fairly mobile and is present in most of the MISS groundwater; however, there is no evidence, based on sampling of offsite wells, that it is migrating across the MISS boundary.

Rare earth elements. The only rare earth elements detected fairly consistently in groundwater were cerium, lanthanum, and neodymium in well B38W18D. This well is located downstream of the former thorium processing area. Cerium, lanthanum, and neodymium have high distribution coefficients (see Table 5-4 for cerium and lanthanum) and are likely to migrate very slowly.

Organics. Like metals, organics are present over a greater range of depths in the soil column than are radionuclides because of the generally higher mobility of these chemicals. VOCs and BNAEs detected in MISS soils are listed in Tables 4-22 and 4-23.

The semivolatile organic compounds are generally less soluble, have higher partition coefficients, and do not appear to have migrated significantly.

Of the organic compounds present in MISS soils, five (tetrachloroethene, 1,2-dichloroethene, toluene, trichloroethene, and vinyl chloride) were detected in offsite downgradient wells (B38W14S, B38W14D, B38W15S, and B38W15D). These organic compounds

are distinguished from others by their high solubilities and relatively low partition coefficients (see Table 5-5) and therefore are the most likely to be found in groundwater. From the bedrock groundwater contours in Figures 3-24 and 3-26, it can be seen that contamination from burial pit 1 and other sources on the Stepan property could be moving to MISS-4B and offsite wells (e.g., B38W14S, B38W14D, and B38W17A). However, only a small amount of organic contaminant source is present at MISS or Stepan. The onsite wells at MISS do not show significant contamination, which suggests that migration of organics from MISS via groundwater is not significant. Trace amounts of VOCs were found at a soil sampling location near burial pit 1 (borehole C296).

Well MISS-4B, located in the southwestern corner of Stepan, also exhibited significant concentrations of volatiles. Some organics are seen in the wells (e.g., B38W14S) that are farthest downgradient, some 183 m (600 ft) from the western boundary of MISS. The exact sources of this downgradient contamination cannot be determined. As stated in Section 4.8, several local sources exist in soil on the Ballod property, where the offsite wells are located.

Another pathway for loss of organic compounds in the soil is via chemical and biological degradation. The estimated half-lives shown in Table 5-7 indicate that organics in soil undergo degradation within a few years, resulting in the presence of degradation products in the soil. The identity of such degradation products is difficult to determine; however, substantial degradation of volatile and semivolatile organics can be predicted to occur over tens of years. Actual degradation rates will depend on site-specific conditions and may substantially differ from the estimates shown in Table 5-7.

5.3.2 Surface Water and Sediment

Because maximum contaminant concentrations in soils at the Maywood Site generally occur in the subsurface, and because the surface itself is either paved or covered with grass, contaminant

migration in surface water and sediment is not considered an important pathway at the Maywood Site.

Some lithium appears to be transported from the Maywood Site via the surface water pathway (Table 4-52). Lithium is quite mobile and was found at high concentrations in the upper soil at depths of 0 to 0.6 m (0 to 2 ft) in several MISS locations (C008, C026, and C023; see Figure 4-26). In addition, a few transition metals (lanthanum and lutetium) and VOCs (sampling location 2) were present. This suggests that only the more mobile contaminants are transported via surface water at low levels.

Current data from sampling of surface water and sediments (at location 4) do not indicate much contamination in Lodi Brook. The brook, which flows through a culvert for most sections, drains parts of the Stepan and Sears properties. No VOCs were detected, and radionuclide concentrations were comparable to those at background sampling locations. Only lithium was detected at concentrations slightly greater than background levels. These findings indicate that there is currently no significant transport (except for lithium) via Lodi Brook. Since Lodi Brook drains large areas of the Stepan and Sears properties as well as other vicinity properties, the exact source of lithium is not known.

5.3.3 Air

Air modeling

Modeling was performed to estimate the emission of VOCs from contaminated soils at the MISS and Stepan properties. The vicinity properties were not included in the modeling effort because concentrations of organic soil contamination are low at these locations. Concentrations of VOCs in soil at MISS and Stepan are presented in Tables 4-16 and 4-11, respectively. Only the air emissions of contaminants that were detected above background levels were considered.

VOCs in soil are emitted primarily via diffusion through the pore space in the vadose zone. The principal parameters that

govern this transport are soil moisture content, soil organic content, soil contaminant concentration, depth of contamination, and K_{oc} and diffusivity of the organic compounds. Conservative estimates of these parameters are used. The contaminant concentration is assumed to be uniform and equal to the maximum measured value. The average depth of concentration is assumed to be 3 m (10 ft). The values for K_{oc} and diffusivity are given in Tables 5-5 and 5-6. Assuming a very low soil moisture content, the diffusion equation is:

$$\left(1 + \frac{r_b K_p}{e H'}\right) \frac{dc}{dt} = D_{ei} \frac{d^2c}{dz^2}, \quad \text{where: } \rho_b = \text{bulk soil density (g/cm}^3\text{),}$$

$$K_p = K_{oc} \times f_{oc} = \text{partition coefficient (cm}^3\text{/g),}$$

$$\epsilon = \text{porosity (unitless),}$$

$$D_{ei} = \text{effective diffusivity} = D_i \epsilon^{0.333} \text{ (cm}^2\text{/s),}$$

$$D_i = \text{molecular diffusivity in air (cm}^2\text{/s), and}$$

$$z = \text{vertical distance from the bottom of contaminated soil zone (cm).}$$

A no-flux boundary at the bottom of the contaminated soil zone is assumed. The emission rate decreases very gradually over time (assuming no degradation or leaching). The emission rate prevailing at the end of one year from the soil sampling date is assumed to be the current emission rate. The flux at the soil surface is defined by the equation:

$$F_A = e D_{ei} \frac{dc}{dz} \Big|_{z=L} \quad \text{where: } F_A = \text{flux at soil surface, and}$$

$$L = \text{depth of contaminated soil zone.}$$

The total emission is defined as:

$$Q = F_A \times A, \quad \text{where: } A = \text{areal extent of contamination (4.7 x}$$

10⁴ m² at MISS; 7.4 x 10⁴ m² at Stepan).

The "Box Model" was used to calculate the concentration of the contaminants in air at the site, using the following equation:

$$C_c = \frac{Q}{\sqrt{A} \times \frac{V_H}{2} \times H},$$

where: C_c = concentration of contaminant in air (mg/m³),
A = areal extent of contamination (4.7 x 10⁴ m² for MISS; 7.4 x 10⁴ m² for Stepan),
V_H = wind velocity at mixing height H (m/s), and
H = effective mixing height = 2 m (assumed).

The mean wind velocity at 10 m (33 ft) for this site is 4.6 m/s (10.2 mph); the prevailing direction is southwest (Section 3.0). The mean wind velocity at 2 m (6.5 ft) above the ground was calculated to be 1.38 m/s (3.06 mph). The estimated current soil emissions and air concentrations are presented in Table 5-9.

Modeling results show that the concentrations of VOCs emitted from the soils at MISS and the Stepan property are below allowable exposure limits.

Based on radon and thoron monitoring and flux measurements at MISS (see Section 4.5), radionuclide transport in air is currently not significant (i.e., levels are below DCGs). No data exist for volatile gas emissions from the site. Thoron and radon are produced via the two radioactive decay series of thorium-232 and uranium-238 (via radium-224 and radium-226, respectively; see radioactive decay chains in Figures 1-6 and 1-7). Thoron has a half-life of only 55 s and is likely to decay substantially in the time it takes to diffuse out of the soil. Thus, radon, with its half-life of 3.8 days, is more predominant in the air. Radium-226 has a half-life of 1,620 years, and its activity changes only slowly through decay. Secular equilibrium exists between radium-226 and radon; therefore, radon emission can be expected to remain constant over the next several years.

The average radon flux measured is 1.29 pCi/m²/s

(4.8×10^{-2} Bq/m²/s). The measured average radon concentration at MISS (0.5 pCi/L or 0.018 Bq/L) minus the contribution from the surrounding area background (0.33 pCi/L or 0.012 Bq/L) is the actual concentration contributed by the emissions from MISS (0.167 pCi/L or 0.006 Bq/L). Although concentrations in air vary with soil moisture and wind speed, annual average concentrations will remain nearly constant and are below the DCG of 3.0 pCi/L (0.110 Bq/L). The concentration can vary as the distribution of radium-226 changes (e.g., due to subsurface transport), which will change the radon emission rates.

Contaminants could migrate from the MISS pile to the air if the engineered pile cover is disturbed.

5.4 CONCLUSIONS

Based on site characterization and monitoring data, some metals and organics could be currently migrating from MISS at low levels in the groundwater. Additional groundwater sampling is being instituted at the MISS perimeter to definitively determine whether or not contaminants are migrating from MISS and/or the burial pits at Stepan. Most of the contamination is currently confined to the vadose zone because of generally high sorption of the contaminants onto the soil matrix, and this represents a dispersion source. For these reasons, the bulk of the contamination is not expected to reach groundwater for an extended period of time. Small areas of contaminated soils already submerged in groundwater at the site will contribute to somewhat faster migration of limited amounts of contamination. The presence of zones having some downward vertical potentiometric gradient induces vertical flow and allows contaminant transport into deeper groundwater.

Sampling data indicate that migration of radionuclides in groundwater is not occurring. However, radionuclides of interest at the Maywood Site have very long half-lives (see Table 5-1) and will reach groundwater without significant decay. If the source of contamination (i.e., radionuclides in soil) remains in place, radioactive contamination of groundwater will increase

significantly. Conservative estimates of radionuclide travel velocities are 0.02 m/yr (0.07 ft/yr) in the shallow groundwater and 0.167 to 0.86 m/yr (0.55 to 2.82 ft/yr) in the bedrock.

Arsenic, barium, copper, lead, lithium, chromium, and selenium are the metals most prevalent in the soils. Given their solubility and adsorption characteristics, arsenic, lithium, copper, and selenium are expected to be most mobile. The installation of additional wells to determine whether offsite migration of metals is occurring has been proposed and submitted to EPA. Chromium, lead, and barium are less mobile and are expected to migrate very slowly. Future migration is potentially of concern because metals are conservative substances and are likely to persist. The more mobile metals (such as arsenic and selenium) are likely to migrate at about 0.5 m/yr (1.6 ft/yr) in the shallow groundwater zone and about 8 m/yr (26.2 ft/yr) in the bedrock zone (at average flow velocities). The other metals will travel at even lower velocities. Some of the VOCs occur at low concentrations in several groundwater locations. Volatile organics such as tetrachloroethene, 1,2-dichloroethene, toluene, trichloroethene, and vinyl chloride are quite soluble and thus are mobile. Some of the mobile VOCs (e.g., 1,2-dichloroethene) could travel with negligible retardation if they reach groundwater.

Surface runoff is currently not an important migration pathway because the surface is covered with vegetation and artificial surfaces. Lithium and several volatile organic compounds have been detected at downstream sampling locations at Westerly Brook. These contaminants may have migrated via surface runoff. If the vegetative cover and artificial surfaces at the site are disturbed, or if the MISS pile cover is compromised, transport of contaminants from the surface soils will increase significantly.

At present, sampling of surface water and sediments in Lodi Brooks does not indicate much contaminant transport (except for lithium). Since Lodi Brook drains large areas of the Stepan and Sears properties as well as other vicinity properties, the exact source of lithium is not known. Although transport of contaminants via Lodi Brook may have occurred in the past, sampling

data do not indicate significant transport at this time. If the surface vegetation or artificial surfaces at the site are disturbed, greater surface migration is likely.

In general, radon emission from soils is quite low and will remain constant unless soil at the site is disturbed. Future emissions of radon, thoron, and volatile organics may increase if the engineered cover over the MISS pile is disturbed. Model calculation results show that the presence of organics (especially VOCs) in site soils does not contribute significantly to organic emissions or concentrations in air.

FIGURES

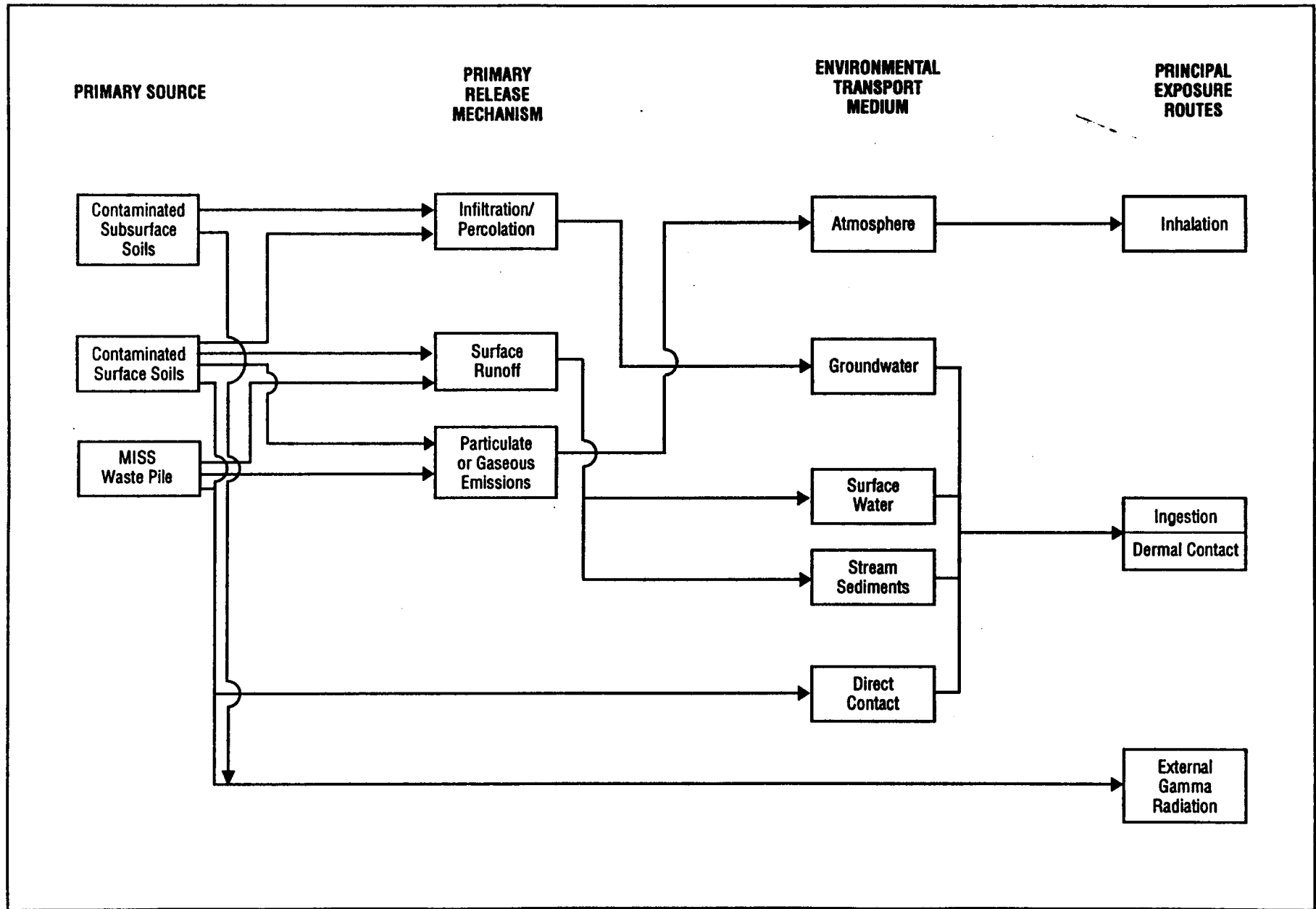


Figure 5-1
Conceptual Site Model

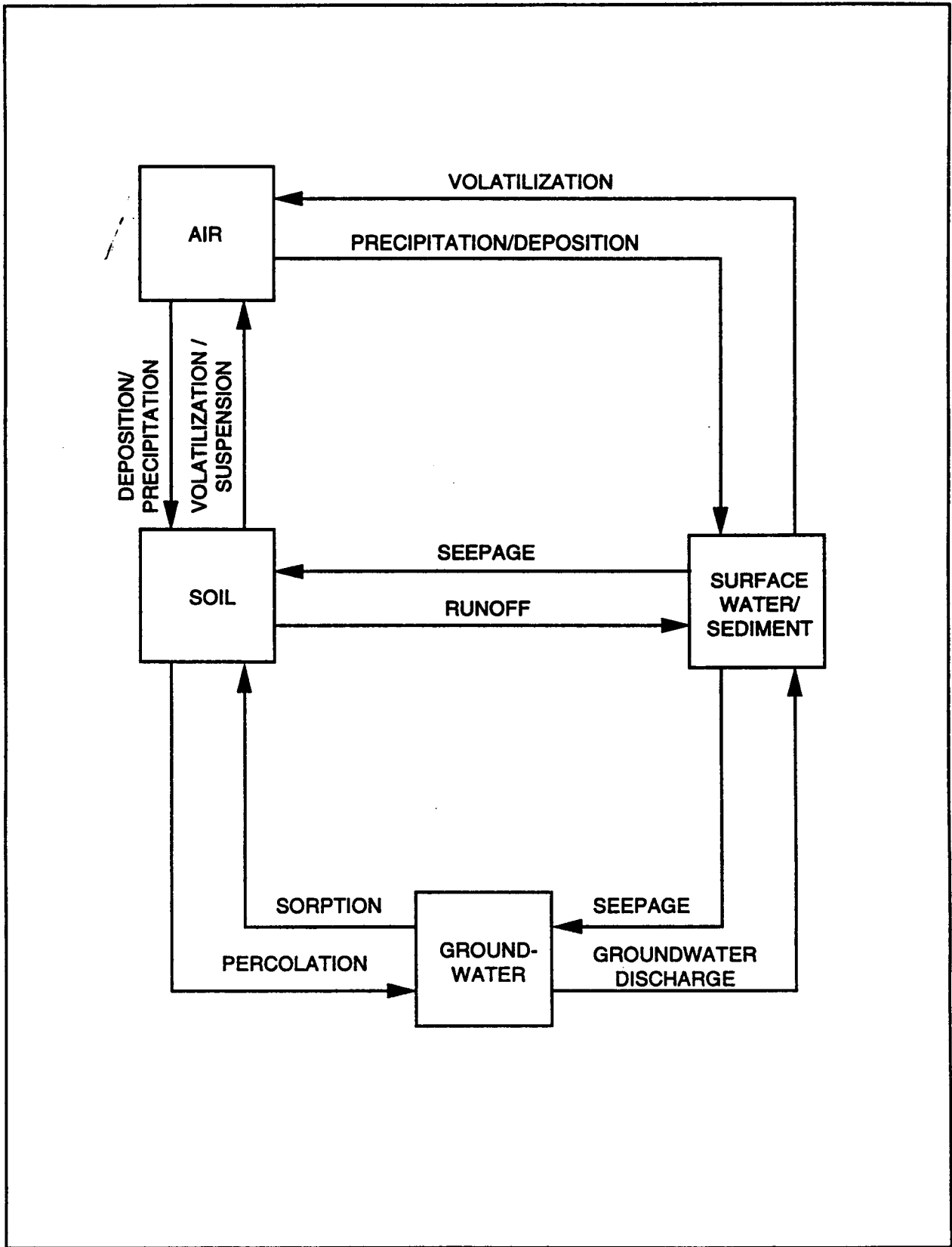


Figure 5-2
Intermedia Transfer Processes

TABLES

Table 5-1
Distribution Coefficients for Radionuclides Found
at the Maywood Site

Radionuclide	Half-Life (yr)	pH	K_d (cm^3/g)	Source Reference
Uranium-238	4.5 X 10 ⁹	8	100	A
		7.7	23,000	B
		4-9	45 ^a	C
		-	450	E
Thorium-232	1.41 X 10 ¹⁰	5	3,000	A
		7	50,000	
		7.7	80,000	B
		4-9	60,000 ^b	C
		-	150,000	E
Radium-226	1,620	4	12	D
		6	60	
		7	100	
		2.2	13	B
		7.7	2,400	
		-	450	E

Sources: A = Rancon 1973; B = Gee et al. 1980; C = Baes and Sharp 1983; D = U.S. Nuclear Regulatory Commission 1980; E = Baes et al. 1984.

^aGeometric mean (GM) of values ranging from 11 to 4,400, with a geometric standard deviation (GSD) of 3.7.

^bGM of values ranging from 2,000 to 510,000, with a GSD of 4.5.

Table 5-2
Distribution Coefficients for Thorium and Uranium
in Various Types of Soil

Soil Conditions	K_d (cm ³ /g)
<u>Thorium</u>	
Silt loam, Ca-saturated clay, pH 6.5	160,000
Montmorillonite, Ca-saturated clay, pH 6.5	400,000
Clay soil, 5 mM Ca(NO ₃) ₂ , pH 6.5	160,000
Medium sand, pH 8.15	40-130
Very fine sand, pH 8.15	310-470
Silt/clay, pH 8.15	270-10,000
Illite, 0.1 g/L Th, pH > 6	<100,000
<u>Uranium</u>	
Silt loam, U(VI), Ca-saturated, pH 6.5	62,000
Clay soil, U(VI), Ca(NO ₃) ₂ , pH 6.5	4,400
Clay soil, 1 ppm UO ²⁺ , pH 5.5	300
Dolomite, 100-325 mesh, brine, pH 6.9	4.5
Limestone, 100-170 mesh, brine, pH 6.9	2.9

Source: Isherwood 1981.

Table 5-3
Solubility Product of Sparingly Soluble
Compounds of Metals Detected at MISS

Page 1 of 2

Compound	Solubility Product	pSP = -log SP
AgCl	1.78 X 10 ⁻¹⁰	9.75
AgOH	1.6 X 10 ⁻⁸	7.8
Ag ₂ CO ₃	8.2 X 10 ⁻¹²	11.09
Ag ₂ Cr ₂ O ₇	1 X 10 ⁻¹⁰	10
AgNO ₂	1.6 X 10 ⁻⁴	3.80
AlAsO ₄	1.6 X 10 ⁻¹⁶	15.80
Ba ₃ (AsO ₄) ₂	7.8 X 10 ⁻⁵¹	50.11
BaCO ₃	5.1 X 10 ⁻⁹	8.29
BaSO ₄	1.1 X 10 ⁻¹⁰	9.97
Be(OH) ₂ (Be ²⁺ , 2OH ⁻)	6.3 X 10 ⁻²²	21.2
(BeOH ⁺ , OH ⁻)	2 X 10 ⁻¹⁴	13.7
Ca ₃ (AsO ₄) ₂	6.8 X 10 ⁻¹⁹	18.17
CaCO ₃	4.8 X 10 ⁻⁹	8.32
CaCrO ₄	7.1 X 10 ⁻⁴	3.15
Ca(OH) ₂ (Ca ²⁺ , 2OH ⁻)	5.5 X 10 ⁻⁶	5.26
(CaOH ⁺ , OH ⁻)	1.4 X 10 ⁻⁴	3.86
CaSO ₄	9.1 X 10 ⁻⁶	5.04
CaSO ₃	4.7 X 10 ⁻⁶	5.53
Cd ₃ (AsO ₄) ₂	2.2 X 10 ⁻³³	32.66
CdCO ₃	5.2 X 10 ⁻¹⁰	11.3
Cd(CN) ₂	1.0 X 10 ⁻⁸	8.0
Cd(OH) ₂	5.9 X 10 ⁻¹⁵	14.23
(after aging)		
CdS	7.9 X 10 ⁻²⁷	26.10
CdSeO ₃	1.30 X 10 ⁻⁹	8.89
Ce(OH) ₃	1.5 X 10 ⁻²⁰	19.82
Ce ₂ (SeO ₃) ₃	3.75 X 10 ⁻²⁵	24.43
Co ₃ (AsO ₄) ₂	7.6 X 10 ⁻²⁹	28.12
CoCO ₃	1.4 X 10 ⁻¹³	12.84
Co(OH) ₂	6.3 X 10 ⁻¹⁵	14.20
(blue)		
Cr(OH) ₂	1.0 X 10 ⁻¹⁷	17.0
Cr(OH) ₃ (Cr ³⁺ , 3OH ⁻)	6.3 X 10 ⁻³¹	30.20
(CrOH ²⁺ , 2OH ⁻)	6.3 X 10 ⁻²¹	20.20
CuBr	5.25 X 10 ⁻⁹	8.28
Cu(OH) ₂	2.2 X 10 ⁻²⁰	19.66
CuCO ₃	2.5 X 10 ⁻¹⁰	9.6
CuCrO ₄	3.6 X 10 ⁻⁶	5.44
CuSO ₃	2.1 X 10 ⁻⁸	7.68
FeAsO ₄	5.8 X 10 ⁻²¹	20.24
Fe(SO ₃) ₃	2 X 10 ⁻³¹	30.7
La(OH) ₃	2.0 X 10 ⁻¹⁹	18.7

Table 5-3
(continued)

Page 2 of 2

Compound	Solubility Product	pSP = -log SP
La ₂ (SO ₄) ₃	3 X 10 ⁻⁵	4.5
Li ₂ CO ₃	3.98 X 10 ⁻³	2.40
LiOH	4 X 10 ⁻²	1.4
Li ₃ PO ₄	3.2 X 10 ⁻⁹	8.5
Mg ₃ (AsO ₄) ₂	2.1 X 10 ⁻²⁰	19.68
MgSeO ₃	1.3 X 10 ⁻⁵	4.89
Mn(AsO ₄) ₂	1.9 X 10 ⁻²⁹	28.72
MnSO ₃	1.26 X 10 ⁻⁷	6.9
Ni ₃ (AsO ₄) ₂	3.1 X 10 ⁻²⁶	25.51
Ni(CN) ₂	3 X 10 ⁻²³	22.5
Ni(OH) ₂	2.0 X 10 ⁻¹⁵	14.70
(freshly-precipitated)		
Ni(OH) ₂	6.3 X 10 ⁻¹⁸	17.20
(after aging)		
PbCl ₂	1.6 X 10 ⁻⁵	4.79
PbCO ₃	7.49 X 10 ⁻¹⁴	13.13
PbCrO ₄	1.8 X 10 ⁻¹⁴	13.75
Pb(OH) ₂ (Pb ²⁺ , 2OH ⁻)	1.1 X 10 ⁻²⁰	19.96
(PbOH ⁺ , OH ⁻)	8.7 X 10 ⁻¹⁴	13.06
PbSe	1 X 10 ⁻³⁸	38.0
PbSeO ₃	3 X 10 ⁻¹²	11.5
PbSeO ₄	1.45 X 10 ⁻⁷	6.86
PbSO ₄	1.6 X 10 ⁻⁸	7.80
PbSeO ₄	1.45 X 10 ⁻⁷	6.84
Ra(NO ₃) ₂	6.2 X 10 ⁻³	2.21
RaSO ₄	4.3 X 10 ⁻¹¹	10.37
Th(OH) ₄	3.2 X 10 ⁻⁴⁵	44.5
Th ₃ (PO ₄) ₄	2.57 X 10 ⁻⁷⁹	78.59
Th(SO ₄) ₂	4 X 10 ⁻³	2.4
UO ₂ C ₂ O ₄	4 X 10 ⁻⁴	3.4
UO ₂ HAsO ₄ (UO ₂ ²⁺ , HAsO ₄ ⁴⁻)	3.2 X 10 ⁻¹¹	10.50
UO ₂ NaAsO ₄	1.3 X 10 ⁻²²	21.87
UO ₂ NH ₄ AsO ₄	1.7 X 10 ⁻²⁴	23.77
UO ₂ (OH) ₂ (UO ₂ ²⁺ , 2OH ⁻)	1 X 10 ⁻²²	22.0
VO(OH) ₂	7.4 X 10 ⁻²³	22.13
V ₂ O ₅ (VO ₂ ⁺ , OH ⁻)	1.6 X 10 ⁻¹⁵	14.8
Zn(CN) ₂	2.6 X 10 ⁻¹³	12.59
ZnCO ₃	1.45 X 10 ⁻¹¹	10.84
Zn(OH) ₂ (Zn ²⁺ , 2OH ⁻)	7.1 X 10 ⁻¹⁶	17.15
(ZnOH ⁺ , OH ⁻)	1.8 X 10 ⁻¹³	12.75
ZnSeO ₃	2.57 X 10 ⁻⁷	6.59

Source: Lurie 1975.

Table 5-4
Typical Average Distribution
Coefficients (K_d) for Various Elements
in Sand, Soils, and Clays

Element	K_d (cm^3/g)	
	Soils and Clays	Sand
As	3	0.3
Ba	50	5
Cd	7	0.7
Ce	1,000	100
Cs	500	80
Cr (+6)	4	0.4
Co	1,000	100
Cu	20	2
La	1,000	100
Pb	100	10
Li	500	50
Mn	200	20
Hg	100	10
Ni	1,000	100
Pu	2,000	200
Ra	70	7
Se	3	0.3
Ag	100	10
Th	60,000	6,000
U	50	5
V	1,000	100
Zn	20	2

Source: Gilbert et al. 1989.

Table 5-5
Molecular Weight, Solubility, Vapor Pressure,
Henry's Constant, and K_{oc} of Selected Organic Compounds

Compound	Molecular Weight (g/mol)	Solubility (mg/L)	Vapor Pressure (mm Hg)	Henry's Constant (atm-m ³ /mol)	K_{oc} (ml/g)
Acenaphthene	154	3.42E+00	1.55E-03	9.20E-05	4600
Acenaphthylene	152	3.93E+00	2.90E-02	1.48E-03	2500
Acetone	58	1.00E+06	2.70E+02	2.06E-05	2.2
Acrylonitrile	53	7.90E+04	1.00E+02	8.84E-05	0.85
Anthracene	178	4.50E-02	1.95E-04	1.02E-03	14000
Benzene	78	1.75E+03	9.52E+01	5.59E-03	83
Benzo(b)fluoranthene	252	1.40E-02	5.00E-07	1.19E-05	550000
Benz(a)anthracene	228	5.70E-03	2.20E-08	1.16E-06	1380000
Benzo(a)pyrene	252	1.20E-03	5.60E-09	1.55E-06	5500000
Benzo(ghi)perylene	276	7.00E-04	1.03E-10	5.34E-08	1600000
Benzo(k)fluoranthene	252	4.30E-03	5.10E-07	3.94E-05	550000
Bis(2-chloroethyl)ether	143	1.02E+04	7.10E-01	1.31E-05	13.9
Carbon disulfide	76	2.94E+03	3.60E+02	1.23E-02	54
Carbon tetrachloride	154	7.57E+02	9.00E+01	2.41E-02	110
Chloroform	119	8.20E+03	1.51E+02	2.87E-03	31
Chrysene	228	1.80E-03	6.30E-09	1.05E-06	200000
Dibenz(a,h)anthracene	278	5.00E-04	1.00E-10	7.33E-08	3300000
Dibutyl phthalate	278	1.30E+01	1.00E-05	2.82E-07	170000
1,1-Dichloroethene	97	2.25E+03	6.00E+02	3.40E-02	65
1,2-Dichloroethene (trans)	97	6.30E+03	3.24E+02	6.56E-03	59
1,2-Dichloroethene (cis)	97	3.50E+03	2.08E+02	7.58E-03	49
1,2-Diphenylhydrazine	184	1.84E+03	2.60E-05	3.42E-09	418
Fluoranthene	202	2.06E-01	5.00E-06	6.46E-06	38000
Fluorene	116	1.69E+00	7.10E-04	6.42E-05	7300
Indeno(1,2,3-cd)pyrene	276	5.30E-04	1.00E-10	6.86E-08	1600000
Nitrobenzene	123	1.90E+03	1.50E-01		36
Pentachlorophenol	266	1.40E+01	1.10E-04	2.75E-06	53000
Phenanthrene	178	1.00E+00	6.80E-04	1.59E-04	14000
Phenol	94	9.30E+04	3.41E-01	4.54E-07	14.2
Pyrene	202	1.32E-01	2.50E-06	5.04E-06	38000
Tetrachloroethene	166	1.50E+02	1.78E+01	2.59E-02	364
Toluene	92	5.35E+02	2.81E+01	6.37E-03	300
1,1,1-Trichloroethane	133	1.50E+03	1.23E+02	1.44E-02	152
Trichloroethene	131	1.10E+03	5.79E+01	9.10E-03	126
Vinyl chloride	63	2.67E+03	2.66E+03	8.19E-02	57
Xylene (mixed)	106	1.98E+02	1.00E+01	7.04E-03	240

Source: EPA 1986.

Table 5-6
Diffusion Coefficients of Some Organic Compounds

Compound	Molecular Weight (g/mol)	Diffusion (cm ² /s)
Acetone	58	0.1093
Anthracene	178	0.0421
Benzene	78	0.0923
Carbon tetrachloride	154	0.0845
Carbon disulfide	76	0.0892
Chloroform	120	0.09404
Tetrachloroethene	166	0.0785
Toluene	92	0.084
Toluene	92	0.083
Trichloroethene	131	0.086
Vinyl chloride	63	0.11375
Xylene	106	0.076

Source: EPA 1986.

Table 5-7
Estimated Half-Lives of Selected Organic Compounds
in Soils and Groundwater

Compound	Molecular Weight (g/mol)	Half-life (days)			
		Soil		Groundwater	
		Low ^a	High ^a	Low ^a	High ^a
Acenaphthene	154	12	102	25	204
Acenaphthylene	152	43	60	85	120
Acetone	58	1	7	2	14
Acrylonitrile	53	1	23	2.5	46
Anthracene	178	50	460	100	920
Benzene	78	5	10	10	720
Benzo(b)fluoranthene	252	360	610	720	1,220
Benz(a)anthracene	228	102	680	204	1,360
Benzo(a)pyrene	252	57	530	114	1,060
Benzo(ghi)perylene	276	590	650	1,170	1,315
Benzo(k)fluoranthene	252	910	2,140	1,820	4,270
Bis(2-chloroethyl)ether	143	28	180	56	360
Carbon tetrachloride	154	180	360	7	360
Chloroform	119	28	180	56	1,825
Chrysene	228	371	993	745	2,000
Dibenz(a,h)anthracene	278	361	940	722	1,880
Dibutyl phthalate	278	2	23	2	23
1,1-Dichloroethene	97	28	180	56	132
1,2-Dichloroethene (trans)	97	28	180	56	2,875
1,2-Dichloroethene (cis)	97	28	180	56	2,875
Fluoranthene	202	140	440	280	880
Fluorene	116	32	60	64	120
Indeno(1,2,3-cd)pyrene	276	600	730	1,200	1,460
Nitrobenzene	123	13	197	2	394
Pentachlorophenol	266	23	178	46	1,533
Phenanthrene	178	16	200	32	400
Phenol	94	1	10	0.5	7
Pyrene	202	210	1,900	420	3,800
Tetrachloroethene	166	180	360	360	720
Toluene	92	4	22	7	28
1,1,1-Trichloroethane	133	140	273	140	546
Trichloroethene	131	180	360	321	1,643
Vinyl chloride	63	28	180	56	2,850
Xylene (mixed)	106	7	28	14	360

Source: Howard et al. 1991.

^aThe low and high half-life values were generally derived from the range of degradation rates of the predominant process (biodegradation/hydrolysis) likely to be occurring.

Table 5-8
Representative Values of Saturated Hydraulic
Conductivity and Saturated Water Content

Texture	Hydraulic Conductivity, K_{sat} (m/yr)	Saturated Water Content, ϕ_{sat}
Sand	5.55×10^3	0.395
Loamy sand	4.93×10^3	0.410
Sandy loam	1.09×10^3	0.435
Silty loam	2.27×10^2	0.485
Loam	2.19×10^2	0.451
Sandy clay loam	1.99×10^2	0.420
Silty clay loam	5.36×10^1	0.477
Clay loam	7.73×10^1	0.476
Sandy clay	6.84×10^1	0.426
Silty clay	3.26×10^1	0.492
Clay	4.05×10^1	0.482

Source: Clapp and Hornberger 1978.

Table 5-9
Soil Emissions and Air Concentrations of VOCs

VOCs	Maximum Soil Concentration (mg/kg)	Soil Emissions (mg/s-m ²)	Air Concentration (mg/m ³)	
MISS	2-Butanone	0.179	3.0×10^{-13}	1.1×10^{-5}
	Carbon disulfide	0.029	4.0×10^{-12}	1.5×10^{-4}
	Toluene	0.16	4.7×10^{-12}	1.8×10^{-4}
	Benzene	0.021	1.0×10^{-12}	3.8×10^{-5}
Stepan	2-Butanone	0.018	3.1×10^{-14}	1.2×10^{-6}
	Toluene	0.19	5.2×10^{-12}	2.0×10^{-4}
	Benzene	0.087	4.2×10^{-12}	1.63×10^{-4}
	Tetrachloroethene	0.015	1.5×10^{-12}	5.7×10^{-5}
	Trichloroethene	0.03	1.8×10^{-12}	7.2×10^{-5}
	Carbon tetrachloride	0.016	2.6×10^{-12}	1.01×10^{-4}
	2-Hexanone	0.11	6.3×10^{-15}	2.4×10^{-7}

6.0 BASELINE RISK ASSESSMENT

A baseline risk assessment (BRA) will be prepared to support the option of implementing a remedial action at the Maywood Site. This will be accomplished by determining potential threats to human health and the environment in the absence of any remedial action at the Maywood Site. To evaluate the hazards posed by current site conditions, the assessment will analyze the environmental pathways to potential receptors from areas where radioactive and chemical contaminants are located. The BRA will follow the approach outlined in EPA's Risk Assessment Guidance for Superfund (RAGS) (EPA 1989a).

Chemical and radiological risks will be analyzed separately to allow the source of risk to be clearly identified and presented. Assessing the radiological and chemical risks together could mask distinct information that would aid in selecting an appropriate remedy. Site data exceeding radiological background concentrations will be used, under plausible scenarios, to estimate committed effective dose equivalents. In applying RAGS guidance for chemicals, site-specific chemical background data will be used, where available, to distinguish between the abundant local industrial contaminants and the potential Maywood Site contaminants.

All available data will be used in preparing the BRA, which will include historical data and will not be limited to the contaminants of concern listed in this RI report.

The Maywood BRA is tentatively scheduled to be released to the public by June 1993. Because the BRA will be used to determine to what extent, if any, site remediation is necessary, it is being prepared by a contractor independent of the remediation contractor.

7.0 SUMMARY AND CONCLUSIONS

This section summarizes the findings of the RI with regard to the nature and extent of contamination for which DOE is responsible under the FFA (see Section 1.2) and the association of radioactive and chemical compounds. At the DOE-owned MISS, DOE is responsible for all radioactive and chemical contaminants on or migrating from MISS. However, at the other three operable units, (i.e., Stepan Company property, residential vicinity properties, and commercial/governmental vicinity properties), DOE is only responsible for remedial action of contaminants from the thorium processing operations and chemical contaminants commingled with radioactive contamination. The nature and extent of contamination in groundwater, surface water, sediments, and air are discussed in Section 7.2. In addition, the fate and transport of the contaminants identified as FUSRAP waste are reviewed with references to the baseline risk assessment and other work that will be conducted at a later date as part of the RI/FS-EIS process.

7.1 SUMMARY OF SITE GEOLOGY AND HYDROLOGY

7.1.1 Site Geology

The bedrock underlying the site is composed of Brunswick Formation red sandstone and siltstone units. The bedrock is Triassic in age and was deposited as part of the Newark group of sediments that were deposited in the large Triassic basin underlying a significant portion of northern New Jersey. The surface of the Brunswick sandstone was extensively weathered and eroded by streams and glacial ice into a series of ridges and valleys. Erosion produced secondary porosity and permeability as both fractures and additional pore space. The configuration of this surface controlled the subsequent deposition and distribution of the overlying unconsolidated sediments, which are composed of fine-grained silt, clay, and sand. Local coarse sand and gravel were deposited in pronounced erosional lows that existed in the

bedrock surface.

7.1.2 Site Hydrology

The two distinct units described in Section 7.1.1 are not separated by a continuous low permeability layer; thus, they behave as a single hydrologic system. Groundwater flow is to the west from MISS, underlying the course of Westerly Brook. This flow direction is controlled by a bedrock low that is present in the local area. Flow velocities are generally moderate to low in both the unconsolidated sediments and bedrock (see Section 3.5). The presence of clays and organic material in the unconsolidated sediments unit retards the movement of radionuclides and chemical contaminants via the groundwater system. Although fate transport information indicates that the movement of contamination offsite is limited, the investigation into its extent is incomplete.

7.2 NATURE AND EXTENT OF CONTAMINATION

This section provides a summary of the nature and extent of contamination at the Maywood Site. Each operable unit is discussed separately, with radiological conditions provided first, followed by chemical contaminants. Sections 1.2 and 4.2 provide the definition of FUSRAP waste that is the basis for delineating the nature and extent of radioactive and chemical contamination for which DOE is responsible.

Based on data collected during the RI and previous characterization activities and on the known volume of waste currently contained in the interim storage pile, waste volumes have been estimated for each of the operable units. These volumes are listed below:

<u>Operable Unit</u>	<u>Volume (yd³)</u>
Stepan	52,000
MISS	175,000*
Residential vicinity properties	15,000
Commercial/governmental vicinity properties	153,000

*Includes 35,000 yd³ currently in the interim storage pile

7.2.1 Stepan Property

Radioactive contaminants

Radioactive contamination on the Stepan property is present in both surface and subsurface soils. Radionuclide concentrations in surface soils ranged from <1.5 to 50 pCi/g, from <0.4 to 130 pCi/g, and from <0.4 to 380 pCi/g for uranium-238, radium-226, and thorium-232, respectively. The largest area of surface contamination is in the northeastern portion of the property in the vicinity of the guard shack, a warehouse building, and a small office/laboratory building (see Figure 4-16). This contaminated area is near or adjacent to a grassy area on which the MCW thorium processing building was formerly located. The contamination is covered with either grass or asphalt pavement, thereby reducing the mobility of the contaminants in air or surface water runoff.

In subsurface soils, radionuclide concentrations ranged from <1.4 to 170 pCi/g, from <0.2 to 333 pCi/g, and from 0.2 to 1,592 pCi/g for uranium-238, radium-226, and thorium-232, respectively. The highest concentration of thorium-232 (1,592 pCi/g) was found in a sample from borehole B3890R167 (E10678, N9778) in burial pit 1. Areas of radioactively contaminated subsurface soils (see Figure 4-18) are primarily burial pits 1, 2, and 3 but also include areas of the property where thorium processing operations were conducted, areas near those locations, and low-lying areas of the property where residues may have been placed as fill material.

Because some thorium compounds are relatively insoluble in water, there is little potential for the subsurface contamination to migrate via groundwater. In areas where subsurface contamination is present at bedrock, samples were obtained from the bedrock. Analytical results for these samples show no indication that bedrock is contaminated with thorium compounds.

Geologic inspection of the soils collected during sampling in

the burial pits (except burial pit 3, which could not be sampled) indicates that the soil is silty clay or clay ranging in color from white to dark grayish-black. The soil texture is stiff and moist in some areas of the burial pits but is dry and fibrous in other areas. This is typical of soil at the Maywood Site where radioactive contamination has been found. It also supports the historical information concerning the mixture of thorium process residues with residues from other MCW process operations (i.e., lithium residues are usually lighter in color and more moist and stiff than thorium process residues). These same soil types were found throughout the Stepan property and were mixed with sands, organic material, and debris where they had been placed as fill material. Most of these areas were identified during the RI as radioactively contaminated.

Soil sampling in burial pits 1 and 2 indicated that process residues that were removed from the diked areas or retention ponds west of Route 17 and reburied in these locations lie atop bedrock.

Samples of bedrock in these locations were analyzed for radionuclides; analytical results indicate that radioactive contamination has not migrated into the bedrock surface. Sampling within burial pit 3 could not be accomplished because the pit is beneath a warehouse (Building 3) that is supported by several hundred wooden pilings.

Radiological surveys of the buildings, performed to confirm data from past surveys, indicated that alpha and beta-gamma surface levels were in excess of DOE guidelines in Buildings 4, 10, 13, 15, 20, 67, and 78. However, none of these buildings contained transferrable (removable) contamination (i.e., the contamination found on structural surfaces is fixed in place by paint or sealer that has been applied to the surfaces and would not be easily transferred to other areas).

Chemical contaminants

The limited chemical assessment of soils on the Stepan property was undertaken to attempt to identify chemical contaminants

associated with the thorium processing operations and to determine whether hazardous wastes, based on RCRA-defined characteristics, are mixed with radioactive contamination.

The results from chemical analyses of soils at Stepan indicated that elevated concentrations of rare earth elements exist in areas of radioactive contamination and, as such, meet the definition of FUSRAP waste. This coexistence was most evident in areas of subsurface (rather than surface) radioactive contamination. The soils within the burial pits have a particle size distribution typical of waste material generated during the thorium extraction process. These same soil types have been observed throughout the Maywood Site, typically where radioactive contamination occurs.

Analytical data indicate a good correlation between the presence of radioactive contamination and the occurrence of various rare earth elements. In areas where radioactive contamination is absent, rare earth elements were detected infrequently and at trace levels. Cerium, lanthanum, and neodymium were detected with greater frequency and at higher concentrations than other rare earth elements. This finding, along with historical information concerning the thorium extraction process and the composition of monazite sands, establishes an association of rare earth elements with the thorium processing operations, although these elements also occur naturally.

Additional sampling on the Stepan property was conducted for analysis of metals, VOCs, and BNAE compounds. Several metals (arsenic, cobalt, copper, lead, nickel, selenium, and vanadium) are known to be elemental components of the original monazite sands (or uranium analogue elements) that were used to extract thorium and, therefore, meet the definition of FUSRAP waste. In general, these metals were detected at the highest concentrations and with the greatest frequency in areas of radioactive contamination. The metals most commonly observed to coexist with radioactive waste were chromium, lithium, arsenic, lead, and selenium. However, an association of these metals with thorium process waste is difficult to determine conclusively due to their abundance in the earth's

crust. The presence of these metals is not atypical of industrialized areas. In general, organic compounds were detected very infrequently and at low concentrations. Both semivolatiles and petroleum hydrocarbons were found at levels above NJDEPE guidelines associated with radioactive waste in the burial pits. Most organic compounds detected at levels above background were PAHs, which may be attributed to the natural decay of organic materials or coal-derivative products. These compounds are commonly found in industrial areas such as the area immediately surrounding the Maywood Site. No conclusive evidence, either from historical information (which indicates that no organic chemicals were used during processing) or from the chemical investigation during this RI, uniquely associates any organic constituents with the thorium processing operations; therefore, they do not meet the definition of FUSRAP waste except where commingled with radioactive contamination.

Soil samples subjected to analysis for TCLP evaluation produced no results that would require classification of the soil as a RCRA-hazardous waste according to federal guidelines. Additionally, testing for corrosivity and reactivity produced no result that would require classification of the soil as a characteristic RCRA-hazardous waste. No PCBs or pesticides were detected in any soil sample analyzed.

The scope of this chemical investigation on the Stepan Company property was, by design, limited. A full-scale and separate investigative study for Stepan and area properties, in the form of an RI/FS, is being conducted by the Stepan Company under a consent order with EPA. This information will be factored into the FS for the Maywood Site, if available. EPA will ensure coordination between the DOE RI/FS and the Stepan RI/FS.

7.2.2 Maywood Interim Storage Site

Radioactive contaminants

Radioactive contaminants in onsite soils at MISS were

investigated and reported prior to completion of this RI (BNI 1987a). The data were used to assist in defining the nature and extent of contamination; however, they are not detailed in this report. Figure 1-10 presents areas of radioactive contamination defined during the 1986 characterization (BNI 1987a). Results from the 1986 characterization ranged from 4.0 to 304 pCi/g for uranium-238, from 1.0 to 447.0 pCi/g for radium-226, and from 1.2 to 1,699 pCi/g for thorium-232. Soil types in areas at MISS where radioactive contamination has been found are similar to those discussed in Section 7.2.1 (i.e., silty sands and clays ranging in color from white or light gray to dark grayish-black or black). These soils contain organic matter and are stiff or fibrous in texture; moisture content varies as well. Downhole gamma logging was performed for each of the chemical sampling locations to assist in identifying the radioactively contaminated zone in each borehole (Table D-25, Appendix D).

During this RI, some radiological sampling of soils in the interim storage pile was done to determine average concentrations of uranium-238, radium-226, and thorium-232. Average concentrations of uranium-238, radium-226, and thorium-232 in the pile were 17, 2.4, and 18.1 pCi/g, respectively.

Radiological characterization of the groundwater, based on routine environmental monitoring data, indicates that total uranium, radium-226, and thorium-232 concentrations detected in samples from offsite and downgradient wells are low and similar to results from upgradient wells. The only exception is the consistent slight elevation in uranium concentrations (10.7 to 29.0 pCi/g) in samples from well B38W12A located on the DeSaussure property downgradient of the Stepan and Sears Distribution Center properties, which are known to be contaminated (BNI 1987c). All concentrations measured are well below DOE guidelines. Additional analyses for radium-228, thorium-228, and thorium-230 indicate that levels of these radioisotopes are indistinguishable from concentrations at upgradient locations.

Results from quarterly surface water monitoring for total uranium, radium-226, and thorium-232 were similar at upstream and

downstream sampling locations and were below DCGs. Most concentrations were below analytical detection limits. Further radiological characterization conducted during recent sampling indicates that radium-228, thorium-228, and thorium-230 also are present at background (upgradient) levels or at concentrations below detection limits. There is no indication that radioactive contamination is currently migrating from MISS via surface water; all results were below DCGs.

As part of the RI, sediment samples were collected from the surface water sampling locations and analyzed for total uranium, radium-226, and thorium-232; no result exceeded DOE guidelines for residual contamination in soil. Additional characterization during recent environmental monitoring indicated low concentrations of radium-228, thorium-228, and thorium-230 comparable to levels of total uranium, radium-226, and thorium-232. Downgradient and upgradient concentrations were similar; there is no indication that radioactive contaminants are leaving MISS via sediment transport.

Air monitoring for radon, both onsite and offsite, indicated that none of the annual average concentrations exceed DCGs or EPA standards. Radon flux monitoring was performed at 192 locations on MISS. At five locations in the vicinity of Building 76, readings exceeded 20 pCi/m²/s, the limit stated in 40 CFR 61, Subpart Q. The highest of the readings was 36.7 pCi/m²/s. The average flux rate for MISS, however, was 1.29 pCi/m²/s, which is well below this limit.

The annual average external gamma exposure rates at MISS for 1990 were 27 mR/yr for onsite locations and 58 mR/yr for fence line locations. (These exposure rates do not include the average background exposure of 68 mR/yr.) Using these data to calculate dose rates yields rates that are well below the DOE protection standard of 100 mrem/yr above background for members of the general public. Given that access to radioactive materials is restricted, these low levels do not pose a health threat to the public.

Chemical contaminants

The chemical investigation of the interim storage pile at MISS was undertaken to evaluate the pile material for possible classification as a RCRA-hazardous waste based on failure of RCRA characteristics analyses. Samples analyzed did not indicate any characteristics of a RCRA waste; therefore, it was concluded that the material is not a hazardous waste. After evaluation of the analytical results, NJDEPE concurred (Kaup 1991).

The purpose of the chemical investigation of soils at MISS onsite locations was to determine the presence and extent of chemical contaminants onsite, including the occurrence of any RCRA-hazardous wastes. Soil samples collected and analyzed for TCLP evaluation produced no results that would classify MISS onsite soils as RCRA-hazardous waste. Additionally, analysis of samples for corrosivity and reactivity indicated that the soil is not a characteristic RCRA-hazardous waste. No PCBs or pesticides were detected in any of the soil samples analyzed.

DOE is responsible for all chemical contamination on MISS. Of the 22 metals detected above representative mean background in MISS onsite soils, 8 (arsenic, cobalt, copper, lead, lithium, nickel, selenium, and vanadium) were identified as constituents of thorium ores, uranium analyte metals, or lithium wastes processed or disposed of onsite. Some of these metals were detected at maximum depths of 5.3 m (17.5 ft) and in areas where process residues were used as fill. Their general spatial occurrence is from an area east of Building 76 to an area west of the storage pile (Figures 4-28 through 4-34). A second smaller area was identified south of the storage pile.

These metals and four others (antimony, barium, chromium, and cadmium) were detected at above-background concentrations (Table 4-20). The latter four metals were also detected with varying frequency in areas of radioactive contamination; however, no definite associations were identified that would tie specific metals to radioactive contamination.

There are five areas of primary soils contamination on MISS. Four areas are associated with former retention ponds, and one area is associated with the thorium processing building (Building 76).

Radioactive contamination was observed at elevated levels to a depth of 6.7 m (22 ft) in the thorium processing areas. Depths of radioactive contamination in the retention ponds average 3.1 to 4.5 m (10 to 15 ft).

Metals commonly are associated with elevated radioactive contamination. The metals most commonly detected at levels above NJDEPE guidelines were chromium, lithium, lead, and arsenic, with sporadic occurrences of nickel, thallium, and cadmium. BNAEs and TPH levels exceeding NJDEPE guidelines were detected both within the primary source areas and outside of areas of contamination. The highest levels were found in the former retention ponds. This association does not specifically indicate that these materials were used in thorium processing operations at MCW since the retention ponds were used by the entire Stepan facility. These materials were probably used in other chemical processing operations at the facility, as evidenced by their distribution over the site.

Further chemical evaluation of soils at MISS onsite locations identified primarily three rare earth elements (cerium, lanthanum, and neodymium) that have been determined to be associated with thorium ores or processes. As such, rare earth elements are constituents of FUSRAP waste. Rare earth elements were found to be present to maximum depths of 6.6 m (21.5 ft) in fill and native material. In most cases, concentrations decreased with depth, indicating only limited downward migration. The higher concentrations occurred at depth in areas suspected of containing buried material. Higher concentrations at depth were found primarily in areas near Building 76, near the interim storage pile, and bordering Route 17. The data indicate that rare earth elements are present primarily in areas and at depths that are radioactively contaminated. Figures 4-36 and 4-37 illustrate the correlation between the detection of rare earth elements and the presence of radioactive contamination.

Trace concentrations of VOCs were detected in samples from onsite borehole locations throughout the site. Concentrations of four volatile constituents were above representative baseline

concentrations in two general areas: the area immediately adjacent to Building 76 and the area west of the interim storage pile near locations of the former MCW retention ponds. BNAE compounds were identified primarily in the same areas. An exception was the occurrence of BNAEs in an area near the MISS/Stepan property boundary. Based on the data collected during this study, no definite correlation was found that would indicate the occurrence of VOCs or BNAEs in areas of radioactive contamination. Although some organic compounds were detected at concentrations slightly above representative baseline for the Maywood area, they were detected infrequently and at low concentrations. Many of the compounds detected are PAHs, which are typically present in industrialized, multiuse urban areas. The presence of PAHs can result from degradation of coal derivatives (e.g., asphalt) or from organic decay (e.g., vegetation). Historical documents and other information about thorium processing operations conducted at MCW indicate that no organic constituents were used; however, DOE is responsible for these contaminants on MISS.

Both volatile and semivolatile organic compounds have been detected in groundwater samples from the site. SDWA MCLs for some of the VOCs have been exceeded in various wells. VOCs were not detected in the background wells. In groundwater samples from MISS, MCLs for tetrachloroethene and trichloroethene were exceeded in wells MISS-1B and MISS-7B, along the western boundary of the site; the MCL for benzene was exceeded in well MISS-2B, along the northern boundary. MCLs for 1,2-dichloroethene, benzene, and vinyl chloride were exceeded in well MISS-4B, east of MISS on the Stepan property. On the Ballod property, offsite and downgradient of MISS, MCLs were exceeded for tetrachloroethene and trichloroethene in wells B58W14S, B38W14D, and B38W15D; 1,2-dichloroethene in well B38W15S; 1,1-dichloroethene in well B38W14S; and vinyl chloride in wells B38W14S and B38W15S.

Arsenic and chromium were detected at concentrations above MCLs in groundwater in a few wells. The observed total and dissolved concentrations of arsenic and chromium and the distribution of these constituents in the groundwater appear to reflect localized

sources associated with contaminated soils. Significant offsite migration of these constituents is not apparent.

Elevated concentrations of sulfate, lithium, and boron were detected in the groundwater from the majority of the wells on the MISS and Ballod properties. The data indicate two primary onsite sources of contamination. One is located along the northern property boundary near wells MISS-2A and -2B. The second source is located along the southwestern property line.

Several rare earths were detected at MISS and Stepan, but there were few obvious locational groupings, and no rare earths were prevalent in either deep or shallow wells. The only obvious association between rare earths detected in groundwater and a localized source area within MISS is the fairly consistent appearance of cerium, lanthanum, and neodymium in samples from well B38W18D, which is located immediately downgradient of the former thorium processing area. The same three rare earths were consistently detected in soil samples from this area.

Characterization of the nature and extent of groundwater contamination is incomplete. The existing analytical data for groundwater are being reevaluated and integrated with other available data (e.g., the analytical data for soils and the hydrogeologic conceptual model). Data deficiencies are being identified and will form the basis for outlining the necessary actions to address these deficiencies. To aid in the delineation of the nature and extent of contamination entering and exiting MISS, additional monitoring points have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan. An addendum to the RI report will be completed after this reevaluation and future work are completed.

The presence of significant quantities of fine-grained materials (clay) in the sediments underlying MISS is believed to retard the movement of both radioactive and chemical contaminants at the site. Cation exchange phenomena and chemical sorption have a significant effect on the rate of movement of contaminants through the subsurface via the groundwater.

Surface water samples collected at locations upstream and

downstream from MISS were analyzed for a suite of indicator parameters, metals, rare earth metals, mobile ions, and volatile and semivolatile organic compounds. Results of these analyses indicated the presence of the metal lithium (concentrations up to 620 ppb) and the organic compounds 1,2-dichloroethene (38 ppb), trichloroethene (13 ppb), and 1,1,2,2-tetrachloroethane (42 ppb) at downstream sampling locations. Lithium probably is migrating from MISS and has been carried by Westerly Brook to the Saddle River. This element may be linked to other process operations conducted by MCW. The source(s) of the volatiles lie somewhere within the MISS/Stepan watershed but cannot conclusively be defined because this area has been industrialized for a long time. One possible source of volatile contaminants is groundwater seepage into an underground culvert that conveys Westerly Brook under MISS. There is no evidence that organics were used in the MCW thorium processing operations; however, these compounds were detected in soil samples from several different locations on MISS and the Stepan property.

Sediment samples were collected from upstream and downstream locations and analyzed for metals to determine whether chemical contaminants were migrating via sediment transport. The findings indicate that MISS is not contributing metal contaminants to sediment transported from the site.

7.2.3 Residential Vicinity Properties

Radioactive contaminants

Radioactive contamination on the residential properties that were part of this investigation is present in both surface and subsurface soils. Concentrations of uranium-238, radium-226, and thorium-232 in surface soils ranged from <2 to 37 pCi/g, from 0.4 to <9 pCi/g, and from <0.5 to 111.6 pCi/g, respectively. Contaminated surface soils are covered by lawns or asphalt driveways and parking areas, thereby reducing the potential for migration of contaminants by air or surface water runoff.

Radionuclide concentrations in subsurface soils on residential properties ranged from <0.2 to <35.3 pCi/g for uranium-238, from <0.2 to 10.8 pCi/g for radium-226, and from <0.3 to 72.5 pCi/g for thorium-232. Depths of subsurface contamination range from 15 cm (6 in.) to 3 m (9 ft); there is no evidence that contamination has migrated below undisturbed soil.

Seven of the eight residential properties investigated during the RI were previously designated for inclusion in FUSRAP. Analytical results of sampling at the single undesignated property (70 W. Hunter Avenue), which is immediately adjacent to burial pit 1 on the Stepan property, indicate that contamination has not migrated onto that property.

Of the other seven properties, three have surface and subsurface contamination that is most likely the result of contaminated fill material (i.e., mulch-like material) and contaminated building materials that were transported from MCW. These properties are 136 W. Central Avenue in Maywood, and 79 Avenue B and 90 Avenue C in Lodi. None of these properties are located sufficiently near the former channel of Lodi Brook for contamination to have resulted from sediment deposition by the brook. The original owner of the property at 90 Avenue C was an employee of MCW. It has been confirmed that contamination on this property (including a portion of the house itself) resulted from fill or mulch and contaminated building materials that were brought to the property by the owner. Contamination in the structure at the 90 Avenue C property was removed by DOE during a time-critical removal action that was completed in July 1991. It is highly probable that the contamination found along the rear of the abutting property at 79 Avenue B resulted either from the use of fill material provided by the owner of 90 Avenue C or from migration of contaminants from the back yard of 90 Avenue C during periods of heavy rainfall and flooding.

Contamination at 62 Trudy Drive and the three Avenue E residences (108, 112, and 113) is the result of sediment deposition via the former Lodi Brook channel. The channel appears to have flowed across or very near the 62 Trudy Drive property, as

indicated by the maximum depth of contamination [2.9 m (9.5 ft)]. During previous characterization activities, higher concentrations of thorium-232 were found at greater depth on properties once occupied by the former channel of Lodi Brook than on properties that were in its floodplain (BNI 1988b, 1989m). In areas formerly occupied by the brook channel, the soil exhibiting higher thorium-232 concentrations is described as a silty sand that is grayish-black and clayey and contains humic material. By contrast, on properties in the floodplain of the brook, elevated thorium-232 concentrations were typically found in soils described as silty sand that is grayish-brown with greenish-gray silt or pale green layers; the elevated thorium concentrations generally were detected at depths of 0.6 m (2 ft) or less, further indicating that they reflect floodplain deposits. In further support of this hypothesis, the three Avenue E properties are across Hancock Street from the original location of the Lodi Brook channel, whereas 62 Trudy Drive is on the same side of Hancock Street as the original (now realigned and culvert-contained) channel. Boreholes were drilled and sampled on Hancock Street during previous characterization activities; analytical results for these samples did not indicate the presence of contamination. However, mechanical disturbance of the soils during development of the street and its underground utilities may have contributed to the contamination found along the boundaries of the Avenue E properties through displacement of contaminated material from the street area onto the property boundaries.

Chemical contaminants

During the chemical investigation at vicinity properties, soil samples from these properties were analyzed to determine whether the soil should be classified as a RCRA-hazardous waste and to determine whether FUSRAP waste constituents were present. The results of sampling and analysis of soils from the vicinity properties indicate that no pesticides or PCBs are present and that the soil is not a RCRA-hazardous waste.

Seven metals that may be present in thorium ores or process wastes (or are uranium analogue elements) were identified as constituents of FUSRAP waste in soil on residential properties. These metals were arsenic, cobalt, copper, lead, nickel, selenium, and vanadium. Three rare earth elements (cerium, lanthanum, and neodymium) were identified as constituents of FUSRAP waste at these properties. These rare earths are known to be components of thorium ores. Although these were the same rare earth elements most frequently detected on MISS and the Stepan property, they were found at much lower concentrations on the residential vicinity properties. The observed decrease in the concentrations of metals and rare earth elements with depth indicated that they probably were present in fill material or in flood deposits transported by Lodi Brook. At sampling locations where elevated concentrations of metals were noted with depth [e.g., the 0.6- to 1.8-m (2- to 6-ft) interval in boreholes at 62 Trudy Drive], their occurrence may be related to the transport and deposition of material via Lodi Brook. In general, metals and rare earth elements were found in areas of radioactive contamination. Their occurrence is most likely attributable to the deposition of thorium process residues.

7.2.4 Commercial/Governmental Vicinity Properties

Radioactive contaminants

On commercial/governmental properties, concentrations of uranium-238, radium-226, and thorium-232 in surface soils ranged from <1.6 to 15 pCi/g, 0.3 to 5.6 pCi/g, and <0.4 to 22 pCi/g, respectively. In subsurface soils, concentration ranges were 0.9 to <14 pCi/g for uranium-238, 0.3 to 10 pCi/g for radium-226, and 0.2 to 31 pCi/g for thorium-232. The depth of subsurface contamination ranges from 15.2 cm (6 in.) to 3 m (9 ft) on the commercial/governmental properties.

Contamination found on the three previously designated properties (200 Route 17, Essex Street and Route 17, and 113 Essex Street) is the result of sediment deposition from the original

channel of Lodi Brook. The original channel, which once flowed across these properties, today is open and aboveground on a portion of the property at 200 Route 17. The channel has been realigned, and flow is contained in a concrete culvert that crosses the property at 113 Essex Street, continues beneath Essex Street, and resurfaces in an open ditch on the north side of Interstate 80. From that point, the channel once again lies underground beneath Interstate 80, resurfaces in a catch-basin on the south side of the interstate, and then continues underground and does not resurface.

The channel has been realigned at numerous locations along its course through Lodi and ultimately empties into the Saddle River.

As on residential properties, the highest thorium-232 concentrations on the commercial/governmental properties were found in areas representing locations of the original stream channel. Computer-enhanced imaging of aerial photographs of the three commercial properties provided evidence of mechanical disturbance during the development of these properties and the realignment of Lodi Brook. In some instances, the original soil was removed to bedrock, and fill material was later emplaced to bring the properties to grade during their development. The findings of geologic investigation and inspection of the soils in areas of highest thorium-232 concentrations on these properties were similar to those at the residential properties; the contamination was found in silty sand that is grayish-black and clayey and may contain organic material.

One undesignated property (205 Maywood Avenue) was investigated because it is immediately adjacent to burial pit 3 on the Stepan property. Analytical results indicate that radioactive contamination is present at the rear of the property along the fenceline bordering Stepan and in two isolated areas on the W. Hunter Avenue boundary of the Myron property. These isolated areas exhibit surface contamination that probably resulted from placement of fill material containing thorium process residues.

Chemical contaminants

Seven metals that may be present in thorium ores or process wastes (or are uranium analogue elements) were identified as constituents of FUSRAP waste in soils at commercial vicinity properties. These metals were arsenic, cobalt, copper, lead, nickel, and vanadium. At 205 Maywood Avenue (Myron Manufacturing), metals were detected at concentrations above representative background in the near-surface sampling interval in an area immediately adjacent to radioactive contamination (see Figure 4-65). At 113 Essex Street (the National Community Bank property), located south (downstream) of MISS, metals were identified at concentrations above representative background from the surface to a depth of 2.4 m (8 ft). Soil samples from the neighboring Sears property (200 Route 17) exhibited above-background concentrations of these metals in the 0- to 0.6-m (0- to 2-ft) interval. The presence of metals at the National Community Bank and Sears properties is probably related to surface water and/or sediment transport and deposition associated with Lodi Brook.

Rare earth elements identified as FUSRAP waste constituents on commercial vicinity properties included cerium, lanthanum, and neodymium; the concentrations of these elements were lower than those found on MISS and Stepan. At the Myron Manufacturing facility, east of the Stepan property, no rare earth elements were detected at concentrations above representative background. However, at 113 Essex Street (National Community Bank) and 200 Route 17 (Sears), which are south of MISS, rare earth elements were identified in surface soils and to a maximum depth of 2.1 m (7 ft).

The detection of metals and rare earths on these vicinity properties is probably the result of the processing of monazite sands at MCW. The locations where metals were found at elevated concentrations indicate that the former channel of Lodi Brook is the probable mechanism of transport and redistribution of this material. Metals contamination is generally confined to areas of radioactive contamination.

Sampling and analysis of soils for organic constituents

indicated that these compounds do not meet criteria for classification as FUSRAP waste. Most organic compounds were found at concentrations that did not exceed the levels detected at representative baseline sampling locations. This finding is not unexpected since no organics are believed to have been used in the thorium processing operations at MCW.

RCRA-characteristic testing of soil from these properties indicated that no hazardous waste is present. In addition, no PCBs or pesticides were detected.

7.3 FATE AND TRANSPORT OF CONTAMINANTS

Contaminants identified as FUSRAP waste at the Maywood Site include radionuclides, metals, and rare earth elements. The primary sources of contamination identified were the burial pits on the Stepan property; the former retention ponds on MISS, the Sears Distribution Center, and the Ballod property; and the interim storage pile on MISS. The physical and chemical properties of the contaminants and the characteristics of the site (including topography, soil properties, geology and hydrology) control the fate and transport of the contaminants. The site conceptual model identified groundwater, surface water, and air as the principal migration pathways. The following sections summarize the fate and transport specific to each of the operable units.

7.3.1 Stepan Property

With respect to the Stepan Company property, the scope of this RI did not include an assessment of groundwater underlying the property or the sampling of air and groundwater for contaminants.

Potential migration pathways for contaminants include groundwater, surface water, sediment, and air. However, because most of the property is covered by either grass or asphalt, transport of radioactive contaminants, metals, or rare earths via surface water and sediment is likely to be minimal unless the covering over contaminated areas is disturbed. Data for sediment

and surface water samples taken from location 4 (downstream of Stepan surface water drainage) support this assumption (see Sections 4.9 and 4.10).

Air could become a primary pathway if activities occurred that disturbed the covering of the contaminated areas; contaminants would then be susceptible to resuspension. Additionally, radium-226 could be moved to the ground surface, where radon-222 could be more readily released to the atmosphere.

The data from routine environmental monitoring indicate the presence of certain metals in the Lodi Brook sediments offsite (see Table 4-52). These metals were also found at similar levels in upstream samples. Only lithium was detected at concentrations above background levels. However, except for small amounts of lithium transport, there is no evidence that metals are migrating from Stepan.

If contaminants in the unsaturated soil zone reach the water table, metals (and to a lesser extent radionuclides) present in soil may migrate into the groundwater.

7.3.2 Maywood Interim Storage Site

The bulk of the contamination is currently confined to the vadose zone because of strong sorption of most contaminants onto the soil matrix. For this reason, the major portion of the contamination is not expected to reach the groundwater for an extended period of time (ranging from tens of years for mobile metals to hundreds of years for radionuclides). At the present time, the contaminated soil zones in certain areas are below the groundwater table.

The radionuclides of interest at the Maywood Site (thorium-232, uranium-238, and radium-226) have very long half-lives (see Table 5-1) and may eventually reach groundwater without significant decay. If this happens, the radioactive contamination of groundwater will increase. Because of the high retardation coefficients of the radioactive constituents of interest, their transport via groundwater will be slow.

Metals have varying migration rates; some metals have migrated farther than the radionuclides and have been detected in the groundwater. Arsenic, barium, copper, lead, lithium, chromium, and selenium are the metals most prevalent in site soils. Based upon their solubility and adsorption characteristics, lithium, arsenic, copper, and selenium are expected to be most mobile. Chromium, lead, and barium are less mobile and are expected to migrate slowly.

The semivolatile organic compounds have not migrated significantly to the groundwater (see Section 4.8.2). Semivolatile organics generally have higher partition coefficients and lower solubility than do the volatile organic compounds, some of which are present in several groundwater locations. The volatile organics (tetrachloroethene, 1,2-dichloroethene, toluene, trichloroethene, and vinyl chloride) are quite soluble and thus are more mobile. The rather low average linear groundwater flow velocity (about 6.1 m/yr) limits the extent of contaminant migration. Organic compounds in the soil can be expected to undergo significant degradation over tens of years.

Surface runoff is currently not a primary migration pathway because of the surface cover of vegetation and concrete. Only the metal lithium and a few VOCs have been identified as migrating from MISS into downstream surface waters (Westerly Brook). The high solubility of lithium enhances its migration potential. Should the surface cover at MISS be removed, additional transport of contaminants from the surface soils could occur. In addition, disturbance of the interim storage pile cover would increase the potential for contaminant migration via surface runoff.

In general, radon emission from soils is relatively low (average of 1.29 pCi/m²/s) and may be expected to remain constant unless the soil at the site is disturbed. Volatile organic emissions from the soil are also likely to be occurring. Modeling results show that air concentrations resulting from VOC emission are not significant. Future emissions of radon and thoron may increase if the engineered cover of the MISS pile is significantly compromised.

7.3.3 Residential Vicinity Properties

Potential pathways for migration of radionuclides and chemicals from these properties include surface water and sediment, leaching and transport in groundwater, and airborne emissions. Because of low soil contamination levels and because all the properties are covered by grass or asphalt, migration via surface water and air pathways is not likely. No material identified as RCRA-hazardous waste has been found to be migrating from these properties. Rare earth elements and certain metals, which are the primary nonradioactive contaminants associated with MCW operations, could migrate vertically downward and enter the groundwater system. Air or surface water could become primary pathways if the covering over contaminated areas were disturbed.

7.3.4 Commercial/Governmental Vicinity Properties

Potential migration pathways include surface water and sediment; however, as observed for residential properties, grass or asphalt cover on these properties makes migration via these pathways unlikely. As on the residential properties, a potential secondary release mechanism is leaching and transport in groundwater. Rare earth elements and certain metals associated with MCW operations have been detected in soil and could migrate downward to reach the groundwater. As was the case at the residential vicinity properties, groundwater monitoring wells were not installed during this RI. Because of the low levels of contamination in the soils, any contaminant transport is likely to be insignificant. Air would become a primary pathway only if activities took place that disturbed the covering over contaminated areas.

7.4 BASELINE RISK ASSESSMENT

A baseline risk assessment for the Maywood Site is being prepared separately to assess the risk to public health and the environment posed by the contamination at the Maywood Site in the absence of remedial action. The assessment is used to determine to what extent, if any, site remediation is necessary.

In determining the health-related implications of the contamination, the assessment will compare risks from concentrations of radionuclides and nonradioactive chemical constituents at the site with risks from naturally occurring (i.e., background) concentrations of these contaminants in soil, air, water, and food and the radiation exposure resulting from this natural environmental radioactivity (i.e., background exposure).

7.5 DATA LIMITATIONS/FUTURE WORK

7.5.1 Data Limitations

The scope of this RI did not include complete chemical characterization of the Stepan property. Stepan Company is under a consent order with EPA to conduct a separate RI/FS, which is being performed by CH2M Hill, starting on a limited basis in 1992. Information from that RI/FS concerning the presence and extent of chemical contamination, especially in areas where radioactive contamination exists, will be needed for the identification of remedial action alternatives that follow this report. It is anticipated that Stepan and DOE data will be exchanged and coordinated by EPA for these purposes.

All radiological data presented in this report have been quality checked via a verification process. This process is less stringent than the assessment and qualification procedures of the Laboratory Data Validation: Functional Guidelines for Evaluating Inorganics Analyses (EPA 1988e). However, it meets generally accepted industry standards for the analysis of radionuclides. Chemical analytical data collected during this RI (i.e., from the fourth quarter of 1990 through the third quarter of 1991) have been subjected to the aforementioned stringent assessment and

qualification procedures (EPA 1988e). Validation procedures were less rigorous during earlier sampling and analysis activities at the site, and data included in this report that were collected prior to this RI are interpreted based on this consideration. The analytical data and validation reports for 1990 and 1991 are available for review.

Based on data collected during chemical characterization of MISS onsite soils, soils contained in the interim storage pile, and soils on residential and commercial/governmental vicinity properties, there appears to be no need for additional sampling. It should be noted that soils contained in the interim storage pile originated on vicinity properties (see Table 1-1) that were remediated in 1984 and 1985, and these soils are considered representative of contaminated soils found at properties that comprise the Maywood Site. Chemical contaminants identified during these sampling activities did not indicate the presence of RCRA-hazardous waste. Organic compounds in general were present only at trace concentrations and did not meet criteria for classification as FUSRAP waste. The metals and rare earth elements that were identified as FUSRAP waste can be traced back to the thorium processing operations conducted by MCW.

7.5.2 Future Work

Future work will include more detailed radiological surveys of the buildings at the Stepan property. Because the Stepan Company is an operating facility and general housekeeping activities such as scrubbing or painting could affect the distribution of contamination on surfaces, the buildings that showed residual radioactivity during this RI will require delineation of this contamination during the remediation process.

Additional work may be required to determine the nature of contamination in burial pit 3 underneath an existing warehouse at Stepan. Access limitations precluded the sampling of this pit during the RI. Subsequent phases of the environmental review process will assume that the waste constituents in burial pit 3 are

the same as those found in burial pits 1 and 2. If further investigations of this pit are required, they will be completed during remediation.

Characterization of the nature and extent of groundwater contamination is incomplete. The existing analytical data for groundwater are being reevaluated and integrated with other available data (e.g., the analytical data for soils and the hydrogeologic conceptual model). To aid in the delineation of the nature and extent of contamination entering and exiting MISS, additional monitoring points have been proposed and are included in a September 1992 addendum to the Maywood field sampling plan. An addendum to the RI report will be completed after this reevaluation and other future work are completed.

In addition to the baseline risk assessment, additional work to be completed during the Maywood RI/FS process includes development of the FS, the purpose of which is to provide information to assist in decision-making regarding remedial action alternatives by presenting their relative strengths and weaknesses. If large data deficiencies are identified, a plan and schedule for the collection of these data will be prepared.

Treatability studies

Several potential remedial action treatment technologies may require bench- or pilot-scale treatability studies. Technologies that may warrant such testing for use at the Maywood Site are listed below:

- Building decontamination: If selected, onsite testing of various decontamination methods may be necessary to determine their effectiveness for specific application to the Stepan and MISS buildings. This information will be needed to complete the remedial design.
- Volume reduction of contaminated soils (physical separation): Separation of soil and radionuclides is highly

dependent upon the physical characteristics of the soil and the radionuclides. Recent EPA studies on Maywood soils indicate that solids separation may be applicable at the Maywood Site.

Identification of wetlands, historic resources and endangered species

Results of a wetland delineation conducted by Stepan as part of their RI will be factored into the baseline risk assessment and FS for the Maywood Site. A determination of the existence or potential existence of any endangered species in the site area will be made. The New Jersey Historic Preservation Office has been consulted regarding the existence of known or potential historic/prehistoric resources in the project area to determine whether a site-specific survey is required. At present, no indication has been given that historic resources exist that would be impacted by remedial activities at the site.

Continued environmental monitoring

Future work at the site will continue to include routine quarterly monitoring of groundwater, sediment, surface water, and air. The monitoring program may be modified with time, and appropriate results will be included in deliberations regarding future activities at the site.

Ambient radon concentrations in the vicinity of Building 76 have not been determined; monitoring began in January 1992 as part of DOE's routine environmental monitoring program.

7.6 IDENTIFICATION OF POTENTIAL REGULATORY REQUIREMENTS

Potential requirements for a proposed remedial action can be grouped into two general categories: (1) ARARs and (2) to-be-considered requirements (TBCs). The first category consists of promulgated standards (e.g., public laws codified at the state or

federal level) that may be applicable to a proposed action or relevant and appropriate to all or part of that action. The second category consists of standards or guidelines that have been published but not promulgated and that may have significance for all or part of the action (e.g., DOE Orders). Remedial actions at the Maywood Site will be conducted in accordance with both ARARs and TBCs, as appropriate.

A potential ARAR is applicable if its jurisdictional prerequisites are specifically met by the conditions of the site (e.g., location in a floodplain) and/or proposed action; if the conditions of a requirement are not specifically applicable, then a determination must be made as to whether they are sufficiently similar to be considered both relevant and appropriate (e.g., in terms of contaminant similarities and the nature and setting of the proposed action). Potential TBCs are typically considered only if no promulgated requirements exist that are either applicable or relevant and appropriate. Thus, TBC requirements may be considered secondary to ARARs; in fact, they are often based on promulgated standards and can require the same degree of compliance as ARARs (e.g., DOE Orders).

In addressing each requirement that may affect a proposed action, a determination is made regarding its relationship to (1) the location of that action, (2) the contaminants involved, and (3) the specific activities that would be conducted.

Location-specific requirements are based on the specific setting and nature of a site (e.g., its location in a floodplain and proximity to wetlands or the presence of archeological and cultural resources). Contaminant-specific requirements address certain chemical species or a class of contaminants (e.g., thorium or PCBs, respectively) and relate to the level of contamination allowed for a specific pollutant in soil, water, and/or air. Action-specific requirements relate to specific activities that are proposed to be implemented at a site (e.g., incineration of organically contaminated soil). Thus, the determination of potential ARARs and TBCs for a site is based on factors specific to that site and the individual action(s) proposed for implementation.

Identification of potential location- and contaminant-specific requirements was initiated during the planning stage of the RI/FS-EIS process. This identification was refined during site characterization (the RI phase) as the nature and extent of contamination and the site setting became more fully understood. Action-specific requirements are to be identified as the potential alternatives for the proposed action are developed in the FS-EIS phase (i.e., as the specific components of these alternatives are assembled).

The preliminary identification of potential requirements for remedial action at the Maywood Site is based on the current understanding of site contamination (e.g., soil and sediments, air, building materials, surface water, and groundwater potentially contaminated with radionuclides and chemicals) and the location of the site in an urbanized area. Requirements that may affect the proposed management of the Maywood Site are listed in Table 7-1. This list is limited to federal requirements; a list of potential state requirements (i.e., those that are more stringent than federal requirements) will be provided by the state of New Jersey, as required under CERCLA, and will be evaluated for inclusion as the RI/FS-EIS process proceeds. To date, NJDEPE has not responded to requests to provide a list of state requirements. Certain of these laws and orders are generically applicable to the authorization, objectives, planning, or implementation of policies or actions related to environmental response (e.g., the Atomic Energy Act and a number of federal orders). Because many of the components of this group have led to the establishment of standard policies and procedures for undertaking response actions, they will not be discussed in detail in the RI/FS-EIS reports. All aspects of the proposed action would fully comply with these laws and orders. Those requirements that may have specific significance to the proposed Maywood remedial action (e.g., RCRA, the Uranium Mill Tailings Radiation Control Act, and the Clean Air Act) will be summarized and evaluated in the FS-EIS report.

7.7 OBJECTIVES OF REMEDIAL ACTION

The overall remedial action objective is to remove, stabilize, or otherwise control contamination at the site that falls under the FFA definition of FUSRAP waste. The baseline risk assessment will introduce the criteria for selecting remedial action alternatives, and the FS will address potential response actions and technologies and conceptual remedial action alternatives.

TABLES FOR SECTION 7.0

Table 7-1
Laws and Orders Potentially Applicable or Relevant
and Appropriate to Proposed Remedial Action
at the Maywood Site

Page 1 of 2

Federal Laws

Archeological and Historic Preservation Act of 1974
Archeological Resources Protection Act of 1979
Atomic Energy Act of 1954, as amended
Clean Air Act of 1963, as amended
Clean Water Act, as amended (also referred to as Federal Water Pollution Control Act of 1972, as amended)
Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended by the Superfund Amendments and Reauthorization Act of 1986
Department of Energy Organization Act of 1977
Endangered Species Act of 1973, as amended
Fish and Wildlife Coordination Act of 1934, as amended
Hazardous Materials Transportation Act of 1974, as amended
National Historic Preservation Act of 1966, as amended
Noise Control Act of 1972
Noise Pollution and Abatement Act of 1970
Occupational Safety and Health Act of 1970
Safe Drinking Water Act of 1974, as amended
Solid Waste Disposal Act, as amended by the Resource Conservation and Recovery Act of 1976, as amended by the Hazardous and Solid Waste Amendments of 1984
Toxic Substances Control Act of 1976
Uranium Mill Tailings Radiation Control Act of 1978, as amended

Executive Orders

Executive Order 11490, Assigning Emergency Preparedness Functions to Federal Departments and Agencies
Executive Order 11514, Protection and Enhancement of Environmental Quality
Executive Order 11738, Providing for Administration of the Clean Air Act and the Federal Water Pollution Control Act with Respect to Federal Contracts, Grants, or Loans
Executive Order 11807, Occupational Safety and Health Programs for Federal Employees
Executive Order 11988, Floodplain Management
Executive Order 11990, Protection of Wetlands
Executive Order 11991, Relating to the Protection and Enhancement of Environmental Quality
Executive Order 12088, Federal Compliance with Pollution Control Standards
Executive Order 12146, Management of Federal Legal Resources
Executive Order 12580, Superfund Implementation

Department of Energy Orders

Order 1540.1 Materials Transportation and Traffic Management
Order 4240.1H Designation of Major System Acquisition and Major Projects
Order 4320.1A Site Development and Facility Utilization Planning
Order 4700.1 Project Management System
Order 5440.1C Implementation of the National Environmental Policy Act
Order 5480.1B Environment, Safety, and Health Program for Department of Energy Operations -- Note: Chapter XI of Order 5480.1B has been amended [see Vaughan (1985) and subsequent updates of Derived Concentration Guides]

Table 7-1
(continued)

Page 2 of 2

Department of Energy Orders (cont'd)

Order 5480.4 Environmental Protection, Safety, and Health Protection Standards
Order 5480.11 Radiation Protection for Occupational Workers
Order 5480.14 Comprehensive Environmental Response, Compensation, and Liability Act Program
Order 5481.1B Safety Analysis Review System
Order 5482.1B Environmental Protection, Safety, and Health Protection Appraisal Program
Order 5483.1A Occupational Safety and Health Program for Government-Owned Contractor-Operated Facilities
Order 5484.1 Environmental Protection, Safety, and Health Protection Information Reporting Requirements
Order 5000.3 Unusual Occurrence Reporting System
Order 5500.2 Emergency Planning, Preparedness, and Response for Operations
Order 5700.6B Quality Assurance
Order 5820.2 Radioactive Waste management

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ORNL, 1986i. Results of the Independent Radiological Verification Survey at 467 Latham Street, Maywood, New Jersey (MJ12L), ORNL/RASA-86/59, Oak Ridge, Tenn. (August).

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ORNL, 1986l. Results of the Independent Radiological Verification Survey at 26 Grove Avenue, Rochelle Park, New Jersey (MJ05L), ORNL/RASA-86/44, Oak Ridge, Tenn. (August).

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ORNL, 1986n. Results of the Independent Radiological Verification Survey at 34 Grove Avenue, Rochelle Park, New Jersey (MJ07L), ORNL/RASA-86/46, Oak Ridge, Tenn. (August).

ORNL, 1986o. Results of the Independent Radiological Verification Survey at 38 Grove Avenue, Rochelle Park, New Jersey (MJ08L), ORNL/RASA-86/47, Oak Ridge, Tenn. (August).

ORNL, 1986p. Results of the Independent Radiological Verification Survey at 42 Grove Avenue, Rochelle Park, New Jersey (MJ09L), ORNL/RASA-86/48, Oak Ridge, Tenn. (August).

ORNL, 1986q. Results of the Independent Radiological Verification Survey at 86 Park Way, Rochelle Park, New Jersey (MJ02L), ORNL/RASA-86/41, Oak Ridge, Tenn. (August).

ORNL, 1986r. Results of the Independent Radiological Verification Survey at 90 Park Way, Rochelle Park, New Jersey (MJ01L), ORNL/RASA-86/18, Oak Ridge, Tenn. (July).

ORNL, 1986s. Results of the Independent Radiological Verification Survey at 59 Avenue C, Lodi, New Jersey (LN008V), ORNL/RASA-86/72, Oak Ridge, Tenn. (December).

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ORNL, 1986w. Results of the Independent Radiological Verification Survey at 64 Trudy Drive, Lodi, New Jersey (LN004V), ORNL/RASA-86/68, Oak Ridge, Tenn. (December).

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ORNL, 1986y. Results of the Independent Radiological Verification Survey at 123 Avenue F, Lodi, New Jersey (LN007V), ORNL/RASA-86/71, Oak Ridge, Tenn. (December).

ORNL, 1986z. Results of the Independent Radiological Verification Survey at 3 Hancock Street, Lodi, New Jersey (LN005V), ORNL/RASA-86/69, Oak Ridge, Tenn. (December).

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ORNL, 1986zb. Results of the Radiological Survey at 11 Branca Court (LJ043), Lodi, New Jersey, ORNL/RASA-86/35, Oak Ridge, Tenn. (September).

ORNL, 1986zc. Results of the Radiological Survey at 16 Long Valley Road (LJ053), Lodi, New Jersey, ORNL/RASA-86/40, Oak Ridge, Tenn. (September).

ORNL, 1986zd. Results of the Radiological Survey at 18 Long Valley Road (LJ052), Lodi, New Jersey, ORNL/RASA-86/39, Oak Ridge, Tenn. (September).

ORNL, 1986ze. Results of the Radiological Survey at 20 Long Valley Road (LJ051), Lodi, New Jersey, ORNL/RASA-86/38, Oak Ridge, Tenn. (September).

ORNL, 1986zf. Results of the Radiological Survey at 22 Long Valley Road (LJ050), Lodi, New Jersey, ORNL/RASA-86/37, Oak Ridge, Tenn. (September).

ORNL, 1986zg. Results of the Radiological Survey at 26 Long Valley Road (LJ049), Lodi, New Jersey, ORNL/RASA-86/36, Oak Ridge, Tenn. (September).

ORNL, 1986zh. Results of the Radiological Survey at 11 Redstone Lane (LJ035), Lodi, New Jersey, ORNL/RASA-86/33, Oak Ridge, Tenn. (September).

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ORNL, 1989c. Results of the Radiological Survey at Interstate 80, North Right-of-Way at Lodi Brook (LJ077), Lodi, New Jersey, ORNL/RASA-88/66, Oak Ridge, Tenn. (June).

ORNL, 1989d. Results of the Radiological Survey at 90 Avenue C (LJ079), Lodi, New Jersey, ORNL/RASA-88/67, Oak Ridge, Tenn. (June).

ORNL, 1989e. Results of the Radiological Survey at 108 Avenue E (LJ084), Lodi, New Jersey, ORNL/RASA-88/72, Oak Ridge, Tenn. (June).

ORNL, 1989f. Results of the Radiological Survey at 112 Avenue E (LJ082), Lodi, New Jersey, ORNL/RASA-88/70, Oak Ridge, Tenn. (June).

ORNL, 1989g. Results of the Radiological Survey at 113 Avenue E (LJ081), Lodi, New Jersey, ORNL/RASA-88/69, Oak Ridge, Tenn. (June).

ORNL, 1989h. Results of the Radiological Survey at 79 Avenue B (LJ091), Lodi, New Jersey, ORNL/RASA-88/79, Oak Ridge, Tenn. (June).

ORNL, 1989i. Results of the Radiological Survey at 136 W. Central Avenue (MJ030), Maywood, New Jersey, ORNL/RASA-88/22, Oak Ridge, Tenn. (February).

ORNL, 1989j. Results of the Radiological Survey at 200 Rt. 17 (MJ035), Maywood, New Jersey, ORNL/RASA-88/23, Oak Ridge, Tenn. (February).

ORNL, 1989k. Results of the Radiological Survey at Rt. 17 and Essex Street (MJ036), Maywood, New Jersey, ORNL/RASA-88/24, Oak Ridge, Tenn. (February).

ORNL, 1989l. Results of the Radiological Survey at 60 Trudy Drive (LJ057), Lodi, New Jersey, ORNL/RASA-99/14, Oak Ridge, Tenn. (March).

ORNL, 1989m. Results of the Radiological Survey at 4 Hancock Street (LJ060), Lodi, New Jersey, ORNL/RASA-88/25, Oak Ridge, Tenn. (September).

ORNL, 1989n. Results of the Radiological Survey at 5 Hancock Street (LJ029), Lodi, New Jersey, ORNL/RASA-87/33, Oak Ridge, Tenn. (September).

ORNL, 1989o. Results of the Radiological Survey at 6 Hancock Street (LJ033), Lodi, New Jersey, ORNL/RASA-88/53, Oak Ridge, Tenn. (June).

ORNL, 1989p. Results of the Radiological Survey at 7 Hancock Street (LJ027), Lodi, New Jersey, ORNL/RASA-87/32, Oak Ridge, Tenn. (September).

ORNL, 1989q. Results of the Radiological Survey at 8 Hancock Street (LJ026), Lodi, New Jersey, ORNL/RASA-87/26, Oak Ridge, Tenn. (March).

ORNL, 1989r. Results of the Radiological Survey at 10 Hancock Street (LJ031), Lodi, New Jersey, ORNL/RASA-88/42, Oak Ridge, Tenn. (June).

ORNL, 1989s. Results of the Radiological Survey at 80 Hancock Street (LJ059), Lodi, New Jersey, ORNL/RASA-88/16, Oak Ridge, Tenn. (March).

ORNL, 1989t. Results of the Radiological Survey at 100 Hancock Street (LJ058), Lodi, New Jersey, ORNL/RASA-88/15, Oak Ridge, Tenn. (March).

ORNL, 1989u. Results of the Radiological Survey at 2 Branca Court, Lodi, New Jersey (LJ036), ORNL/RASA-88/44, Oak Ridge, Tenn. (June).

ORNL, 1989v. Results of the Radiological Survey at 4 Branca Court, Lodi, New Jersey (LJ037), ORNL/RASA-88/52, Oak Ridge, Tenn. (June).

ORNL, 1989w. Results of the Radiological Survey at 6 Branca Court, Lodi, New Jersey (LJ041), ORNL/RASA-88/47, Oak Ridge, Tenn. (June).

ORNL, 1989x. Results of the Radiological Survey at 14 Long Valley Road (LJ070), Lodi, New Jersey, ORNL/RASA-88/19, Oak Ridge, Tenn. (December).

ORNL, 1989y. Results of the Radiological Survey at 24 Long Valley Road (LJ048), Lodi, New Jersey, ORNL/RASA-87/35, Oak Ridge, Tenn. (August).

ORNL, 1989z. Results of the Radiological Survey at 17 Redstone Lane (LJ030), Lodi, New Jersey, ORNL/RASA-88/41, Oak Ridge, Tenn. (June).

ORNL, 1989za. Results of the Radiological Survey at 80 Industrial Road, Lodi, New Jersey (LJ061), ORNL/RASA-88/17, Oak Ridge, Tenn. (July).

ORNL, 1989zb. Results of the Radiological Survey at 106 Columbia Lane, Lodi, New Jersey (LJ063), ORNL/RASA-88/56, Oak Ridge, Tenn. (July).

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ORNL, 1989zd. Results of the Radiological Survey at the Firemen's Memorial Park and Fire Hall No. 2, Garibaldi Avenue and Kennedy Drive, Lodi, New Jersey (LJ066), ORNL/RASA-88/58, Oak Ridge, Tenn. (August).

ORNL, 1989ze. Results of the Radiological Survey at National Community Bank, 113 Essex Street (MJ021), Maywood, New Jersey, ORNL/RASA-88/51, Oak Ridge, Tenn. (September).

ORNL, 1989zf. Results of the Radiological Survey at 160 Essex Street, Lodi, New Jersey (LJ072), ORNL/RASA-88/49, Oak Ridge, Tenn. (June).

ORNL, 1989zg. Results of the Radiological Survey at 174 Essex Street, Lodi, New Jersey (LJ073), ORNL/RASA-88/50, Oak Ridge, Tenn. (June).

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REMEDIAL INVESTIGATION REPORT

FOR THE MAYWOOD SITE

NEW JERSEY

VOLUME II

DECEMBER 1992

Prepared for

United States Department of Energy

Oak Ridge Field Office

Under Contract No. DE-AC05-91OR21949

By

Bechtel National, Inc.

Oak Ridge, Tennessee

Bechtel Job No. 14501

APPENDIX A

**Summary of DOE Guidelines
for Residual Radioactive Contamination**

Appendix A

Summary of DOE Guidelines for Residual Radioactive Contamination

BASIC DOSE LIMITS

The basic limit for the annual radiation dose (excluding radon) received by an individual member of the general public is 100 mrem/yr. In implementing this limit, DOE applies as low as reasonably achievable principles to set site-specific guidelines.

SOIL GUIDELINES

Radionuclide	Soil Concentration (pCi/g) Above Background ^{a,b,c}
Radium-226 Radium-228 Thorium-230 Thorium-232	5 pCi/g when averaged over the first 15 cm of soil below the surface; 15 pCi/g when averaged over any 15-cm-thick soil layer below the surface layer.
Other Radionuclides	Soil guidelines will be calculated on a site-specific basis using the DOE manual developed for this use.

STRUCTURE GUIDELINES

Airborne Radon Decay Products

Generic guidelines for concentrations of airborne radon decay products shall apply to existing occupied or habitable structures on private property that has no radiological restrictions on its use; structures that will be demolished or buried are excluded. The applicable generic guideline (40 CFR 192) is: In any occupied or habitable building, the objective of remedial action shall be, and reasonable effort shall be made to achieve, an annual average (or equivalent) radon decay product concentration (including background) not to exceed 0.02 WL^d. In any case, the radon decay product concentration (including background) shall not exceed 0.03 WL. Remedial actions are not required in order to comply with this guideline when there is reasonable assurance that residual radioactive materials are not the cause.

External Gamma Radiation

The average level of gamma radiation inside a building or habitable structure on a site that has no radiological restrictions on its use shall not exceed the background level by more than 20 μ R/h and will comply with the basic dose limits when an appropriate-use scenario is considered.

Indoor/Outdoor Structure Surface Contamination

Radionuclide ^f	Allowable Surface Residual Contamination ^e (dpm/100 cm ²)		
	Average ^{g,h}	Maximum ^{h,i}	Removable ^{h,j}
Transuranics, Ra-226, Ra-228, Th-230, Th-228 Pa-231, Ac-227, I-125, I-129 ^k	100	300	20
Th-Natural, Th-232, Sr-90, Ra-223, Ra-224 U-232, I-126, I-131, I-133	1,000	3,000	200
U-Natural, U-235, U-238, and associated decay products	5,000 α	15,000 α	1,000 α
Beta-gamma emitters (radionuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others noted above ^l	5,000 $\beta - \gamma$	15,000 $\beta - \gamma$	1,000 $\beta - \gamma$

Appendix A (Continued)

- ^aThese guidelines take into account ingrowth of radium-226 from thorium-230 and of radium-228 from thorium-232, and assume secular equilibrium. If either thorium-230 and radium-226 or thorium-232 and radium-228 are both present, not in secular equilibrium, the guidelines apply to the higher concentration. If other mixtures of radionuclides occur, the concentrations of individual radionuclides shall be reduced so that (1) the dose for the mixtures will not exceed the basic dose limit, or (2) the sum of ratios of the soil concentration of each radionuclide to the allowable limit for that radionuclide will not exceed 1 ("unity").
- ^bThese guidelines represent allowable residual concentrations above background averaged across any 15-cm-thick layer to any depth and over any contiguous 100-m² surface area.
- ^cIf the average concentration in any surface or below-surface area less than or equal to 25-m² exceeds the authorized limit or guideline by a factor of $(100/A)^{1/2}$, where A is the area of the elevated region in square meters, limits for "hot spots" shall also be applicable. Procedures for calculating these hot spot limits, which depend on the extent of the elevated local concentrations, are given in the supplement of the FUSRAP Summary Protocol. In addition, every reasonable effort shall be made to remove any source of radionuclide that exceeds 30 times the appropriate limit for soil, irrespective of the average concentration in the soil.
- ^dA working level (WL) is any combination of short-lived radon decay products in 1 liter of air that will result in the ultimate emission of 1.3×10^5 MeV of potential alpha energy.
- ^eAs used in this table, dpm (disintegrations per minute) means the rate of emission by radioactive material as determined by correcting the counts per minute measured by an appropriate detector for background, efficiency, and geometric factors associated with the instrumentation.
- ^fWhere surface contamination by both alpha- and beta-gamma-emitting radionuclides exists, the limits established for alpha- and beta-gamma-emitting radionuclides should apply independently.
- ^gMeasurements of average contamination should not be averaged over an area of more than 1 m². For objects of less surface area, the average should be derived for each such object.
- ^hThe average and maximum dose rates associated with surface contamination resulting from beta-gamma emitters should not exceed 0.2 mrad/h and 1.0 mrad/h, respectively, at a depth of 1 cm.
- ⁱThe maximum contamination level applies to an area of not more than 100 cm².
- ^jThe amount of removable radioactive material per 100 cm² of surface area should be determined by wiping an area of that size with dry filter or soft absorbent paper, applying moderate pressure, and measuring the amount of radioactive material on the wipe with an appropriate instrument of known efficiency. When removable contamination on objects of surface area less than 100 cm² is determined, the activity per unit area should be based on the actual area and the entire surface should be wiped. It is not necessary to use wiping techniques to measure removable contamination levels if direct scan surveys indicate that total residual surface contamination levels are within the limits for removable contamination.
- ^kGuidelines for these radionuclides are not given in DOE Order 5400.5; however, these guidelines are considered applicable until guidance is provided.
- ^lThis category of radionuclides includes mixed fission products, including the Sr-90 which is present in them. It does not apply to Sr-90 which has been separated from the other fission products or mixtures where the Sr-90 has been enriched.

Sources: U.S. Department of Energy, DOE Order 5400.5, *Radiation Protection of the Public and the Environment*, Office of Environment, Safety and Health (February 1990).

U.S. Department of Energy, *FUSRAP Management Requirements and Policies Manual*, Appendix D-1, FUSRAP Summary Protocol (March 24, 1986).

APPENDIX B

**Summary of Technical Specifications for the
Installation of Boreholes and Monitoring Wells**

APPENDIX B
SUMMARY OF TECHNICAL SPECIFICATIONS FOR
BOREHOLES AND MONITORING WELL INSTALLATION

Characterization of FUSRAP sites typically includes a site geologic investigation and collection of various environmental samples for analysis in the laboratory. The principal support activities to accomplish a site characterization include drilling radiological/chemical and geologic boreholes and installing groundwater monitoring wells.

Because all specialized support activities are typically conducted by subcontractors, the primary source of details will be contained in the scope of work and the technical specifications developed for a subcontract. The scope of work and drawings specifically define the tasks that will be done, and the technical specifications identify how the tasks are to be done. This appendix summarizes the requirements delineated in the actual subcontract document.

B.1 RADIOLOGICAL AND CHEMICAL BOREHOLES

The specifications include a discussion of general requirements related to any contract activity. These requirements include quality standards that address QC of the materials used for the activity and any standards specific to the activity. For radiological and chemical boreholes, all work is conducted in compliance with the Occupational Safety and Health Administration (OSHA) Standards (29 CFR 1926/1910). Specific requirements are summarized in detail in the following sections.

B.1.1 Documentation

With the drilling of radiological and chemical boreholes, specific information must be recorded in the field logs. All logs are required to show borehole number, date of drilling, locations (i.e., site coordinates), ground surface elevation, description of

the material encountered by the boring, depth at which each change in material occurs, depth at which samples were obtained and the type of sample in each instance, percentage of sample recovery, depth to water table, depth to original ground, and any other data pertinent to the identification of subsurface materials.

B.1.2 Equipment and Materials

Specific requirements are developed for the following equipment and materials:

- Drill rig and support equipment
- Cement/bentonite grout
- Granular bentonite
- Cleaning material (deionized water, hydrochloric acid, soap, solvents)
- Temporary casing
- Surface protection materials (plastic sheeting, plywood)
- Perimeter barricade
- Borehole cover and markers
- Sediment barriers
- Sampling equipment

B.1.3 Field Operations

Predrilling

- Underground utilities in the work area are evaluated. For example, before drilling operations begin, all local utility companies (e.g., gas, water, sewer, electric, telephone) are contacted to determine and confirm locations of underground utilities in the work areas. All utility locations in the work areas are identified and visibly marked.
- A water-handling procedure is developed. For example, all water discharged from the boreholes during drilling

operations is collected in a mud tub. Contents of the mud tub are transferred to drums and disposed of or stored onsite where indicated on the design drawings.

- Safety and security measures are evaluated. For example, perimeter barricades are provided around work areas during work operations if required. Barricades are placed to provide sufficient mobility for work operations within the barricaded area and not interfere with activities of occupants in the work areas. Barricades remain in place until all work within the barricaded area is completed.

Drilling

- Drilling operations are managed from the field site. Boreholes are drilled at locations shown on the design drawings and in the sequence determined at the site. Some adjustment of locations may be required at the site.
- Before drilling, surface protection material is placed over and around the drill hole location in a manner that will prevent the drill spoils from contacting the surrounding surfaces. Drill spoils are confined on the surface protection material around each borehole, collected, and transported to and disposed of in the spoils area shown on the design drawing.
- All drill holes are drilled straight and free of obstructions, to permit free and easy installation of temporary casing for downhole radiological logging.
- When obstructions are encountered in drill holes or if unstable material is encountered, suitable methods are used to drill through such obstructions. Temporary casings may be used where necessary to keep the holes open and enable the holes to be advanced.

- Drilling is not permanently interrupted before reaching the required depth without prior approval.
- Drill holes abandoned before reaching the required depth because of equipment failure, negligence, or other such causes are subject to rejection and replacement with a supplementary hole adjacent to the abandoned hole. Abandoned holes are backfilled as specified.
- Until abandoned drill holes are backfilled, borehole covers and appropriate markers are used to minimize the hazardous condition created by an open drill hole.
- Drilling is performed in a manner that permits continuous soil sampling.
- For drilling/sampling activities associated with chemical boreholes, the tool joint lubricant for assembly of drill rods, auger flights, sampling apparatus, and other downhole items is Teflon tape, graphite powder, and/or apiezon grease (e.g., Dow Corning High Vacuum Grease or equivalent material). Oil and/or grease are not used on downhole items for chemical boreholes.

General

- All downhole items such as augers and temporary casings are cleaned and radiologically surveyed before work commences at the next borehole. Cleaning is done with brushes, scrapers, rags, and other items as necessary to remove surface contamination. Materials are kept wet during brushing and scraping operations to reduce the potential for inhalation of contaminants.
- The deionized water and soap used for cleaning are handled and disposed of with the water from the decontamination operations. Solvent (isopropyl alcohol), used and unused,

is handled as a flammable material. The hydrochloric acid (3 to 5 percent) is handled and disposed of independently.

Cleaning for radiological boreholes

The sampling apparatus and other downhole items used in radiological boreholes are cleaned before each use so that they are free of visible soil, debris, and other foreign matter.

Cleaning for chemical boreholes

The drill rod assemblies, lead auger flights, center plugs, sampling apparatus, and other downhole items that could affect sample integrity are cleaned before each use in a chemical borehole in accordance with the applicable method set forth below.

Method I: When not analyzing for metals

- (1) Clean with one or both of the following:
 - Steam with soap
 - High-pressure water with soap
- (2) Rinse with deionized water
- (3) Rinse with isopropyl alcohol
- (4) Rinse thoroughly with deionized water
- (5) Air dry before use

Method II: When analyzing for metals

- (1) Clean with one or both of the following:
 - Steam with soap
 - High-pressure water with soap
- (2) Rinse with deionized water
- (3) Rinse with nitric acid
- (4) Rinse with deionized water
- (5) Rinse with isopropyl alcohol
- (6) Rinse thoroughly with deionized water
- (7) Air dry before use

Soil samples

- Soil samples are obtained using a recognized sampling technique such as a split-barrel sampler, thin-walled tube sampler, Central Mine Equipment (CME) sampler, and/or other techniques as approved by BNI before sampling.
- Samples are submitted to BNI at the point and time of recovery. BNI is responsible for furnishing containers, placing samples into containers, and labeling containers as appropriate.

Backfilling boreholes

All boreholes are backfilled upon direction from BNI unless noted otherwise. Boreholes drilled through surface asphalt or concrete are backfilled with cement/bentonite grout using the tremie method to allow for placement of an asphalt or concrete patch. Boreholes not drilled through surface asphalt or concrete are backfilled using either the dry pack method or the tremie method. The dry pack method is not used for drill holes that contain water. The backfilling-with-spoils method may be used only if specifically allowed in the subcontract scope of work or design drawings.

Dry pack method

The dry packing method is performed using granular bentonite emplaced in maximum 0.3-m (1-ft) lifts and thoroughly rodded with a solid bar or suspended weight to preclude voids in the filled borehole. The dry pack method is not used when the borehole contains water, unless approved in advance by BNI.

Tremie method

The tremie method uses cement/bentonite grout starting at the bottom of the borehole. Grout is emplaced in one continuous operation. The tremie pipe is withdrawn as grout is emplaced but the pipe is kept below the surface of the grout at all times. Should loss or shrinkage of grout occur, holes are refilled with grout until grout is within 1.3 cm (0.5 in.) of the required elevation as shown on the design drawings.

Backfilling-with-spoils method

Drill spoils from a borehole may be used to fill that hole only where permitted by the design drawings or scope of work. Backfilling is performed in maximum 0.3-m (1-ft) lifts. Each lift is thoroughly compacted using a solid bar or suspended weight to preclude voids. Backfill is emplaced until it is at the same elevation as the area surrounding the borehole.

B.2 GEOLOGIC BOREHOLES

The specifications include a discussion of general requirements related to any contract activity. These requirements include quality standards that address QC materials used for the activity and any standard specific to the activity. For geologic boreholes, all work will be conducted using the specific requirements summarized in detail in the following sections.

- OSHA 29 CFR Occupational Safety and Health Standards (Part 1910 and Part 1926)
- ASTM D 1586 Penetration Test and Split-Barrel Sampling of Soils
- ASTM D 1587 Standard Method for Thin-Walled Tube Sampling of Soils

- ASTM D 2113 Standard Practice for Diamond Core Drilling for Site Investigation
- USBR E-18 Field Permeability Tests in Boreholes (Earth Manual)

B.2.1 Documentation

With the drilling of geologic boreholes, field logs require recording of specific information. All logs show borehole number; date of drilling; location (i.e., site coordinates); ground surface elevation; description of the material in the boring; depth at which each change in material occurs; depth at which samples were obtained and the type of sample in each instance; percentage of sample recovery depth to water table; depth to original ground; and any other data pertinent to the identification of subsurface materials.

B.2.2 Equipment and Materials

Specific requirements for equipment and materials will be developed for the following:

- Drill rig and support equipment
- Permeability testing equipment
- Cement/bentonite grout
- Granular bentonite
- Hole support and conductor casings
- Surface protection materials (plastic sheeting, plywood)
- Protective barriers
- Sampling equipment

B.2.3 Field Operations

Predrilling

- Underground utilities in the work area are evaluated. For example, before drilling operations begin, all local utility companies (e.g., gas, water, sewer, electric, telephone) are contacted to determine and confirm locations of underground utilities in the work areas. All utility locations in the work areas are identified and visibly marked.
- A water-handling procedure is developed. For example, all water discharged from the boreholes during drilling operations is collected in a mud tub. Contents of the mud tub are disposed of where indicated on the design drawings.
- Safety and security measures are evaluated. For example, perimeter barricades are provided around work areas during all work operations if required. Barricades are placed to provide sufficient mobility for work operations within the barricaded area and not interfere with activities of occupants in the work areas. Barricades remain in place until all work within that barricaded area is completed.

Drilling

- Drilling operations are managed from the field site. Boreholes are drilled at locations shown on the design drawings and in the sequence determined at the site. Some adjustment of locations may be required at the site.
- Before drilling, surface protection material is placed over and around the drill hole location in a manner that will prevent the drill spoils from contacting the surrounding surfaces. Drill spoils are confined on the surface

protection material around each borehole, collected, and transported to and disposed of in the spoils area shown on the design drawing.

- All drill holes are drilled straight and free of obstructions to permit free and easy installation of temporary casing for downhole radiological logging.
- When obstructions or unstable materials are encountered in drill holes, suitable methods are used to drill through such obstructions. Where necessary, temporary casings may be used to keep the holes open and enable the holes to be advanced.
- Drilling is not permanently interrupted before reaching the required depth without prior approval.
- Drill holes abandoned before reaching the required depth because of equipment failure, negligence, or other such causes are subject to rejection and replacement with a supplementary hole adjacent to the abandoned hole. Abandoned holes are backfilled as specified. Until abandoned drill holes are backfilled, borehole covers and appropriate markers are used to minimize the hazardous condition created by an open drill hole.
- Drilling is performed in a manner that permits disturbed and undisturbed sampling of the overburden and core sampling of rock where required.
- Core drilling begins at the top of rock, and all intervals in rock are advanced by diamond core drilling methods (ASTM D 2113). All drilling is done in a manner that allows the maximum amount of core recovery.

- No drilling additives, drilling mud, organic solvents, or cleaning solutions may be introduced into drill holes without prior approval by BNI.

Sampling

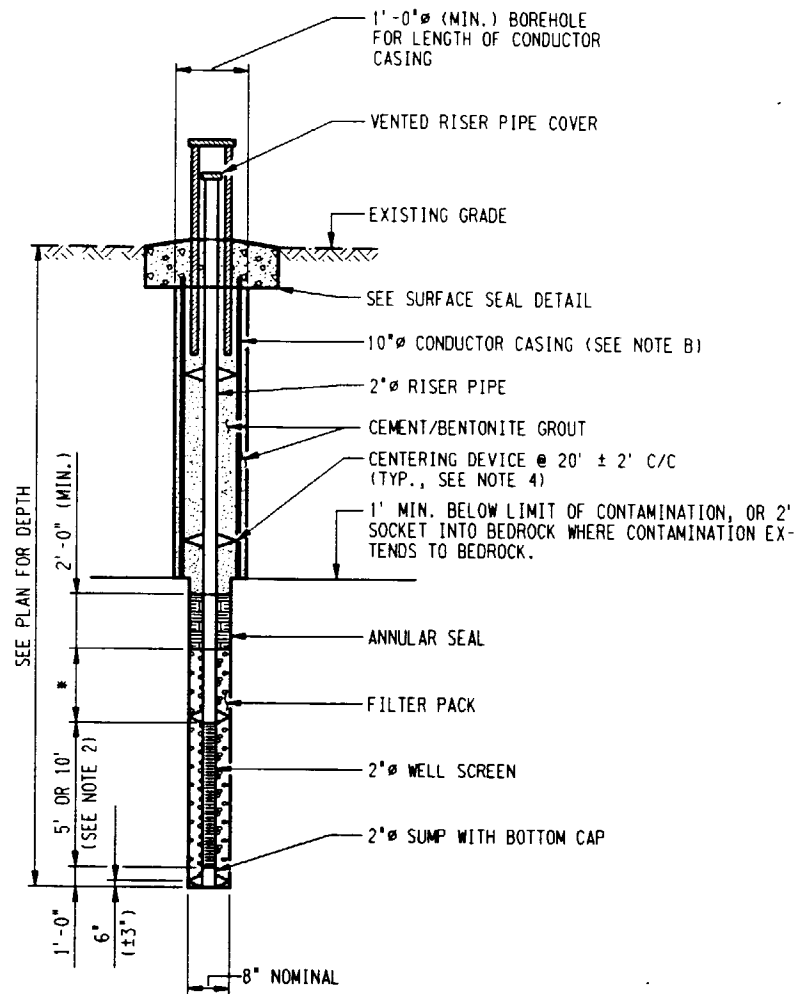
- Soil samples are obtained by a recognized sampling technique using a split-barrel sampler, thin-walled tube sampler, CME-type sampler, and/or other device approved by BNI before sampling.
- Core sampling is conducted in accordance with ASTM D 2113 unless directed otherwise by BNI. Sampling is continuous, and all core samples are preserved in labeled core boxes.
- Samples are submitted to BNI at the point and time of recovery. BNI is responsible for furnishing containers, placing samples in containers, and labeling containers as appropriate.

Conductor casing

Conductor casings are installed through contaminated strata, as determined by BNI, as shown on the design drawings. Boreholes that require conductor casings are reamed to the diameter and length shown on the design drawings, and the conductor casing is installed in accordance with the technical specifications. Conductor casings remain in place following installation. Specific wells and borings using conductor casing are those drilled in suspected or known areas of contamination. Details of monitoring well construction using conductor casing are shown in Figure A-1.

Backfilling boreholes

All boreholes are backfilled upon direction from BNI unless noted otherwise. Boreholes drilled through surface asphalt or concrete are backfilled with cement/bentonite grout using the



* = 2' TO 10' (AS DETERMINED
IN THE FIELD BY BECTEL)

TYPE III WELL INSTALLATION

NTS

NOTES:

- A. TYPE III BOREHOLE IS FOR OUTDOOR LOCATIONS WHERE: A MONITORING WELL IS TO BE INSTALLED THROUGH A POTENTIALLY CONTAMINATED STRATA INTO AN UNCONTAMINATED STRATA; OR OVERBURDEN COLLAPSES UPON REMOVAL OF AUGER.
- B. CONDUCTOR CASING SHALL BE INSTALLED TO THE REQUIRED DEPTH PRIOR TO DRILLING BELOW THE BOTTOM OF THE CONDUCTOR CASING. CONDUCTOR CASING SHALL BE EMBEDDED 1" TO 3" IN THE CONCRETE SURFACE SEAL (EXCEPT FLUSH MOUNT SEAL).
- C. LIMIT OF CONTAMINATION WILL BE ESTABLISHED IN THE FIELD BY BECTEL.

FIGURE B-1 STANDARD WELL INSTALLATION

tremie method to allow for placement of an asphalt or concrete patch. Boreholes not drilled through surface asphalt or concrete are backfilled using either the dry pack method or the tremie method. The dry pack method is not used for drill holes that contain water. The backfilling-with-spoils method may be used only if specifically allowed in the subcontract scope of work or design drawings.

Dry pack method

The dry packing method is performed using granular bentonite emplaced in maximum 0.3-m (1-ft) lifts and thoroughly rodded with a solid bar or suspended weight to preclude voids in the filled borehole. The dry pack method is not used when the borehole contains water unless approved in advance by BNI.

Tremie method

The tremie method uses cement/bentonite grout starting at the bottom of the borehole. Grout is emplaced in one continuous operation. The tremie pipe is withdrawn as grout is emplaced but the pipe is kept below the surface of the grout at all times. Should loss or shrinkage of grout occur, holes are refilled with grout until grout is within 1.3 cm (0.5 in.) of the required elevation shown on the design drawings.

Backfilling-with-spoils method

Drill spoils from a borehole may be used to fill that hole only where permitted by the design drawings or scope of work. Backfilling is performed in maximum 0.3-m (1-ft) lifts. Each lift is thoroughly compacted using a solid bar or suspended weight to preclude voids. Backfill is emplaced until it is at the same elevation as the area surrounding the borehole.

B.3 INSTALLATION OF MONITORING WELLS

The specifications include a discussion of general requirements related to any contract activity. These requirements include standards that address QC materials used for the activity and any applicable standards specific to the activity. For the installation of monitoring wells, all work will be conducted using the standards and codes listed below. Specific requirements are summarized in detail in the following sections.

- OSHA 29 CFR Occupational Safety and Health Standards (Part 1910 and Part 1926)
- ASTM A 312 Standard Specification for Seamless and Welded Austenitic Stainless Steel Pipe
- ASTM C 136 Standard Method for Sieve Analysis of Fine and Coarse Aggregates

B.3.1 Documentation

With the installation of monitoring wells, documentation required from the subcontractor will include the following items:

- Catalog cuts
- Samples of materials
- Certified sieve analysis
- Detail or shop drawings

All documentation will be transmitted to BNI at least two weeks before use, fabrication, or implementation.

B.3.2 Equipment and Materials

Specific requirements will be developed for the following equipment and materials:

- Drill rig and support equipment
- Conductor casing
- Riser pipe
- Screen
- Filter pack
- Annular seal
- Cement/bentonite grout
- Surface casing and protective cap
- Well cap
- Surface seal
- Centering device

B.3.3 Monitoring Well Installation

- Monitoring wells are installed in previously drilled boreholes at specified locations. If necessary, the boreholes are reamed to the size shown on the design drawings.
- The final depth of the hole is measured and the stainless steel riser pipe assembly (i.e., riser pipe screen, sump, and bottom cap) is constructed and installed in the borehole. Installation is conducted in accordance with technical specifications.
- After the riser pipe assembly is installed, the hole is cleaned by pumping water into the riser pipe and allowing it to flow to the surface through the annulus. The filter pack is installed during cleaning as specified in the technical specifications.
- After installation of the filter pack, the annular seal is installed and the remainder of the annular space is filled with grout. Should loss or shrinkage of grout occur, holes are refilled until they remain full.

- Each monitoring well is tested after the grout has set to confirm that the well is operative.
- The surface casing, cap, and seal are installed at each monitoring well, as shown on the design drawings.

B.3.4 Well Development

Installed wells are developed to maximize the yield of water per foot of drawdown and to extract from the water-bearing formation the maximum practical quantity of fines that may be drawn through the screen when the well is pumped under maximum conditions of drawdown. The subcontractor shall submit the well development procedures to BNI for review. Well development procedures shall be in accordance with NJDEP Permit No. NJ0054500.

APPENDIX C

Radiological Data, Chemical Data,
and Geologic Logs for Stepan Property

Contents

RADIOLOGICAL DATA

Table		Page
C-1	Surface and Subsurface Radionuclide Concentrations in Soil, Stepan Property	C-1
C-2	Downhole Gamma Logging, Results Stepan Property	C-35
C-3	Gamma Radiation Exposure Rates, Stepan Property	C-143

CHEMICAL DATA

Table		Page
C-4	Metals and Rare Earths, Stepan Property Soil Samples	C-147
C-5	Volatile Organic Compounds, Stepan Property Soil Samples	C-154
C-6	BNAEs, Stepan Property Soil Samples	C-156
C-7	PCBs, Stepan Property Soil Samples	C-160
C-8	Pesticides/PCBs, Stepan Property Soil Samples	C-164
C-9	Total Petroleum Hydrocarbons, Stepan Property Soil Samples	C-166
C-10	TCLP Metals, Stepan Property Soil Samples	C-167
C-11	TCLP Volatile Organic Compounds, Stepan Property Soil Samples	C-173
C-12	TCLP BNAEs, Stepan Property Soil Samples	C-179
C-13	TCLP Pesticides, Stepan Property Soil Samples	C-185
C-14	TCLP Herbicides, Stepan Property Soil Samples	C-190
C-15	Corrosivity/Reactivity, Stepan Property Soil Samples	C-195
C-16	Mobile Ions, Stepan Property	C-202

GEOLOGIC LOGS

Property

Page

Stepan

C-211

Radiological Data

Table C-1
Surface and Subsurface Radionuclide Concentrations in Soil,
Stepan Property

Page 1 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface					
9720	9410	0.0 - 0.5	< 7.7	< 1.3	12.8 \pm 4
9730	9520	0.0 - 0.5	< 19.9	2.5 \pm 0.1	14.3 \pm 0.4
9740	9410	0.0 - 0.5	< 5.1	< 1	< 1.6
9740	9430	0.0 - 0.5	< 2.9	< .7	1.1 \pm 0.6
9780	9630	0.0 - 0.5	< 7.1	1.2 \pm 0.2	7.4 \pm 2.4
9780	9690	0.0 - 0.5	< 7.9	1.6 \pm 1.0	10 \pm 2.1
9780	9760	0.0 - 0.5	< 4.6	1 \pm 0.2	3.9 \pm 1.6
9810	9360	0.0 - 0.5	< 5.8	1.9 \pm 0.6	6.8 \pm 1.0
9810	9700	0.0 - 0.5	< 7.4	< 1	8.1 \pm 0.1
9840	9050	0.0 - 0.5	< 5.8	3.9 \pm 1.0	16 \pm 2
9850	9040	0.0 - 0.5	< 9.5	1.8 \pm 0.5	5.4 \pm 0.9
9870	9610	0.0 - 0.5	< 9.4	< 1.5	7.7 \pm 2.5
9870	9780	0.0 - 0.5	< 7.6	2.5 \pm 0.6	17.3 \pm 3.2
9910	9120	0.0 - 0.5	< 7.6	3.6 \pm 0.4	21.5 \pm 2.5
9910	9580	0.0 - 0.5	< 34.1	3.7 \pm 0.8	55.6 \pm 1.6
9910	9610	0.0 - 0.5	< 6.4	1.2 \pm 0.2	2.7 \pm 0.2
9920	9210	0.0 - 0.5	< 13	7.3 \pm 1.2	49 \pm 3
9930	9100	0.0 - 0.5	< 5.9	2.1 \pm 0.7	8.4 \pm 1.1
9930	9110	0.0 - 0.5	< 6.9	2.4 \pm 0.3	19.9 \pm 3.1
9950	9590	0.0 - 0.5	< 7.3	1.8 \pm 0.5	7.5 \pm 1.9
9950	9600	0.0 - 0.5	< 2.1	< .5	< .7

Table C-1
(continued)

Page 2 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
9960	9120	0.0 - 0.5	< 17	30.6 \pm 2.6	79.6 \pm 15.2
9960	9360	0.0 - 0.5	< 4.5	2.1 \pm 0.5	5 \pm 1.0
9960	9520	0.0 - 0.5	< 9.5	1.4 \pm 0.5	14.9 \pm 3.7
9970	9050	0.0 - 0.5	21 \pm 19	5.2 \pm 1.5	89 \pm 4
9980	9100	0.0 - 0.5	14 \pm 13	4.3 \pm 0.9	39 \pm 2
9980	9120	0.0 - 0.5	< 6.8	3.3 \pm 0.8	9 \pm 0.6
9990	9510	0.0 - 0.5	< 9.1	1.1 \pm 0.2	14.1 \pm 3.8
10000	9740	0.0 - 0.5	< 4	< .8	4.1 \pm 0.7
10010	9110	0.0 - 0.5	< 5.5	1.5 \pm 0.5	4.4 \pm 0.8
10010	9750	0.0 - 0.5	< 5.9	1.7 \pm 0.4	6.1 \pm 0.8
10030	9710	0.0 - 0.5	< 4.8	1.4 \pm 0.6	6.2 \pm 1.1
10036	9194	0.0 - 0.5	< 3.7	1 \pm 0.2	3 \pm 0.4
10040	9180	0.0 - 0.5	< 6	1.7 \pm 0.7	5 \pm 1.2
10040	9190	0.0 - 0.5	< 6.6	2.4 \pm 0.6	5.9 \pm 0.9
10040	9710	0.0 - 0.5	< 4.2	.8 \pm 0.5	4.8 \pm 0.9
10050	9180	0.0 - 0.5	< 5.3	1.6 \pm 0.5	4.4 \pm 1.1
10060	9610	0.0 - 0.5	< 3.7	.8 \pm 0.3	3.9 \pm 1.4
10070	9160	0.0 - 0.5	< 3.8	1 \pm 0.3	1.9 \pm 0.5
10070	9190	0.0 - 0.5	< 6	1.5 \pm 0.6	4.5 \pm 1.1
10086	9206	0.0 - 0.5	< 4	< 1	2.3 \pm 0.9
10100	9762	0.0 - 0.5	< 17.2	7.4 \pm 0.7	65.9 \pm 6.1
10136	9217	0.0 - 0.5	< 5.7	1.6 \pm 1.4	3.1 \pm 1.4

Table C-1
(continued)

Page 3 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
10140	9780	0.0 - 0.5	< 30	37 \pm 2	160 \pm 10
10150	9762	0.0 - 0.5	< 31	35.9 \pm 0.8	204 \pm 31.2
10160	9780	0.0 - 0.5	< 50	100 \pm 10	380 \pm 10
10180	9770	0.0 - 0.5	< 35	130 \pm 10	290 \pm 10
10186	9217	0.0 - 0.5	< 4.9	< 1.1	3.9 \pm 1.3
10195	9335	0.0 - 0.5	< 9.7	2.7 \pm 0.7	4 \pm 1.1
10200	9335	0.0 - 0.5	< 4.4	1.1 \pm 0.5	1.3 \pm 0.7
10200	9762	0.0 - 0.5	< 26.2	18.9 \pm 2.5	153.7 \pm 20.1
10200	9770	0.0 - 0.5	< 24	23 \pm 2	82 \pm 5
10210	9230	0.0 - 0.5	< 2.5	< .7	1.3 \pm 0.5
10230	9220	0.0 - 0.5	< 3.2	.9 \pm 0.4	2.6 \pm 0.7
10230	9380	0.0 - 0.5	< 3	1.1 \pm 0.3	2.5 \pm 1.3
10236	9217	0.0 - 0.5	< 4.4	2.6 \pm 0.6	5.7 \pm 0.8
10240	9700	0.0 - 0.5	< 8.8	1.8 \pm 0.6	6.8 \pm 1.2
10240	9730	0.0 - 0.5	< 9.9	9.7 \pm 1.1	28 \pm 2
10250	9250	0.0 - 0.5	< 2.4	< .6	1.1 \pm 0.5
10250	9300	0.0 - 0.5	< 2	< .5	< .8
10250	9350	0.0 - 0.5	< 2.2	< .5	1.4 \pm 0.9
10250	9420	0.0 - 0.5	< 13	8.3 \pm 1.0	57 \pm 2
10250	9440	0.0 - 0.5	< 20	6.2 \pm 1.1	36 \pm 2
10250	9460	0.0 - 0.5	< 15	11 \pm 1	15 \pm 2
10255	9750	0.0 - 0.5	< 17.6	4.5 \pm 0.7	14.4 \pm 2.0

Table C-1
(continued)

Page 4 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
10260	9220	0.0 - 0.5	< 3.8	2.2 \pm 0.3	5.7 \pm 1.5
10260	9470	0.0 - 0.5	< 6.4	3.6 \pm 0.6	23 \pm 1
10270	9230	0.0 - 0.5	< 5.0	2.2 \pm 0.5	6.1 \pm 0.9
10270	9420	0.0 - 0.5	< 35	24 \pm 3	210 \pm 10
10270	9440	0.0 - 0.5	7.4 \pm 5.5	7.5 \pm 0.6	46 \pm 1
10280	9220	0.0 - 0.5	< 4.4	1.9 \pm 0.6	4.3 \pm 0.9
10280	9430	0.0 - 0.5	< 6.7	2.6 \pm 0.8	24 \pm 2
10280	9460	0.0 - 0.5	< 10	3.9 \pm 0.6	31 \pm 1
10280	9480	0.0 - 0.5	< 7.7	1.6 \pm 0.7	14 \pm 2
10280	9780	0.0 - 0.5	< 26	14 \pm 2	110 \pm 4
10286	9217	0.0 - 0.5	5.2 \pm 4.8	3.9 \pm 0.7	10 \pm 1
10290	9230	0.0 - 0.5	< 3.4	1.1 \pm 0.4	3.9 \pm 1.6
10290	9280	0.0 - 0.5	< 3.7	1.3 \pm 0.2	3.9 \pm 1.7
10293	9252	0.0 - 0.5	< 3.6	1.1 \pm 0.4	1.9 \pm 0.4
10300	9220	0.0 - 0.5	< 4.2	< 1	4.4 \pm 0.3
10300	9250	0.0 - 0.5	< 2.1	< .6	1.2 \pm 0.2
10300	9320	0.0 - 0.5	< 8.9	3.8 \pm 0.6	22.5 \pm 1.5
10300	9350	0.0 - 0.5	< 2.4	< .6	< .9
10300	9470	0.0 - 0.5	< 18	7.1 \pm 1.3	81 \pm 4
10310	9400	0.0 - 0.5	< 15	8.2 \pm 2.7	6.8 \pm 0.8
10310	9410	0.0 - 0.5	< 11.6	4.3 \pm 0.6	33.4 \pm 5.2
10320	9780	0.0 - 0.5	< 8.3	6.8 \pm 0.3	33.1 \pm 2.9

Table C-1
(continued)

Page 5 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
10336	9217	0.0 - 0.5	< 6.1	4.5 \pm 0.7	13 \pm 1
10340	9220	0.0 - 0.5	< 4	3.5 \pm 0.5	15 \pm 1
10350	9470	0.0 - 0.5	< 5.6	2 \pm 0.4	10.9 \pm 0.6
10350	9710	0.0 - 0.5	< 1.6	< .4	.5 \pm 0.4
10350	9900	0.0 - 0.5	8.5 \pm 7.8	13 \pm 1	68 \pm 2
10350	10000	0.0 - 0.5	< 6.1	1.4 \pm 0.7	14.1 \pm 2.6
10350	10020	0.0 - 0.5	< 5	3.5 \pm 0.6	14 \pm 1
10360	9220	0.0 - 0.5	< 9.4	3.7 \pm 0.6	16 \pm 2
10360	9830	0.0 - 0.5	< 4.4	1.9 \pm 0.5	10 \pm 0.2
10360	9860	0.0 - 0.5	< 9.2	3.5 \pm 0.6	160.3 \pm 5.1
10360	9890	0.0 - 0.5	< 8	2.5 \pm 0.8	45.4 \pm 3.7
10370	9260	0.0 - 0.5	5.5 \pm 3.9	3.1 \pm 0.6	11 \pm 1
10370	9790	0.0 - 0.5	< 8.3	7.7 \pm 0.2	44.8 \pm 1.4
10370	9870	0.0 - 0.5	< 6.1	2.3 \pm 0.3	19.5 \pm 0.8
10370	9890	0.0 - 0.5	< 8.8	5.3 \pm 1.9	24.1 \pm 1.7
10380	9750	0.0 - 0.5	< 9.8	15.4 \pm 2.8	102.7 \pm 0.4
10380	9920	0.0 - 0.5	< 5.7	3.8 \pm 1.7	10.7 \pm 0.8
10386	9217	0.0 - 0.5	< 8.5	9.2 \pm 1.0	27 \pm 2
10390	9220	0.0 - 0.5	11 \pm 5	4.7 \pm 0.9	18 \pm 3
10390	9250	0.0 - 0.5	17 \pm 13	8.4 \pm 1.0	37 \pm 5
10390	10330	0.0 - 0.5	< 6.8	17 \pm 1	34 \pm 2
10400	9450	0.0 - 0.5	< 4.4	1.2 \pm 0.7	8.7 \pm 2.6

Table C-1
(continued)

Page 6 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
10400	9520	0.0 - 0.5	< 6.4	2 \pm 0.8	5.2 \pm 1.0
10400	9600	0.0 - 0.5	< 1.6	< .4	< .4
10400	9750	0.0 - 0.5	< 8.8	10.7 \pm 1.4	52.1 \pm 2.8
10400	9800	0.0 - 0.5	< 9	7.5 \pm 0.4	50.4 \pm 2.0
10400	9900	0.0 - 0.5	< 4.4	< 1	4.7 \pm 2.8
10400	9950	0.0 - 0.5	< 5.7	1.7 \pm 0.4	12.6 \pm 1.7
10413	9264	0.0 - 0.5	< 4.5	1.3 \pm 0.4	2.7 \pm 0.2
10420	9220	0.0 - 0.5	< 6	2.8 \pm 1.2	6.7 \pm 0.5
10420	9250	0.0 - 0.5	< 4.8	1.3 \pm 0.6	3.9 \pm 1.3
10420	9750	0.0 - 0.5	< 25	13 \pm 2	94 \pm 4
10420	9800	0.0 - 0.5	< 17	5.7 \pm 1.4	31 \pm 3
10420	9810	0.0 - 0.5	< 10	3.2 \pm 0.6	18 \pm 1
10420	9950	0.0 - 0.5	< 18	5.4 \pm 1.5	38 \pm 3
10430	9700	0.0 - 0.5	< 8.5	5.1 \pm 0.9	33 \pm 2
10430	9730	0.0 - 0.5	< 22	9 \pm 2	70 \pm 4
10438	9235	0.0 - 0.5	< 4.2	5.1 \pm 0.8	16 \pm 2
10440	9900	0.0 - 0.5	< 4.1	2.1 \pm 0.4	6.8 \pm 0.9
10450	9600	0.0 - 0.5	< 3.4	1.5 \pm 0.7	3.2 \pm 0.7
10450	9650	0.0 - 0.5	< 4.4	1.8 \pm 0.1	7.6 \pm 3.1
10450	9700	0.0 - 0.5	< 4.4	1.8 \pm 0.8	6.6 \pm 0.7
10450	9810	0.0 - 0.5	< 7.4	3.2 \pm 0.7	14 \pm 2
10450	9850	0.0 - 0.5	< 9.4	2.6 \pm 0.7	18 \pm 1

Table C-1
(continued)

Page 7 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
10450	9900	0.0 - 0.5	< 5.6	1.9 \pm 0.5	5.2 \pm 0.8
10450	9930	0.0 - 0.5	< 9.7	2.1 \pm 0.8	9.3 \pm 1.5
10460	9520	0.0 - 0.5	< 4.7	1 \pm 0.4	2.7 \pm 0.6
10460	9700	0.0 - 0.5	< 10	5.7 \pm 1.4	31 \pm 3
10460	9800	0.0 - 0.5	< 20	7.2 \pm 1.6	65 \pm 4
10460	9950	0.0 - 0.5	< 4.3	1.7 \pm 0.6	6.9 \pm 1.1
10480	9230	0.0 - 0.5	< 6.4	1.8 \pm 0.5	9.5 \pm 1.0
10480	9800	0.0 - 0.5	11 \pm 10	4.2 \pm 1.0	20 \pm 2
10486	9217	0.0 - 0.5	< 6.1	5.1 \pm 0.7	17 \pm 2
10490	9760	0.0 - 0.5	< 3.1	1.5 \pm 0.4	6.2 \pm 0.7
10500	9900	0.0 - 0.5	< 6.6	2.5 \pm 0.6	3 \pm 0.9
10510	9780	0.0 - 0.5	< 3.6	1.9 \pm 0.3	6.8 \pm 0.6
10520	9630	0.0 - 0.5	< 6.7	1.2 \pm 0.5	5.3 \pm 0.9
10530	9770	0.0 - 0.5	< 4	2 \pm 0.4	4.1 \pm 0.7
10536	9217	0.0 - 0.5	6.6 \pm 5.2	3.6 \pm 0.5	14 \pm 2
10550	9500	0.0 - 0.5	< 2.4	< .8	< 1.3
10550	9850	0.0 - 0.5	< 1.7	.8 \pm 0.3	1 \pm 0.6
10550	9900	0.0 - 0.5	< 2.6	1.3 \pm 0.4	1.6 \pm 0.5
10570	9290	0.0 - 0.5	< 5.1	1.9 \pm 0.4	2.6 \pm 0.8
10580	9220	0.0 - 0.5	< 12	3.3 \pm 0.1	10.8 \pm 1.3
10586	9217	0.0 - 0.5	< 4.5	.9 \pm 0.3	1.9 \pm 0.6
10590	9800	0.0 - 0.5	< 6.1	1.8 \pm 0.6	6.2 \pm 1.1

Table C-1
(continued)

Page 8 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
10600	9250	0.0 - 0.5	< 3	< .4	.4 \pm 0.3
10600	9500	0.0 - 0.5	< 5.7	1 \pm 0.3	1.4 \pm 0.4
10600	9900	0.0 - 0.5	2.8 \pm 2.3	.7 \pm 0.3	.9 \pm 0.4
10600	9950	0.0 - 0.5	< 2.9	1.1 \pm 0.3	3.6 \pm 0.6
10650	9250	0.0 - 0.5	< 2.7	< .6	< 1
10650	9300	0.0 - 0.5	< 3	< .06	1.2 \pm 0.6
10650	9400	0.0 - 0.5	< 2.7	< .6	1.5 \pm 0.6
10650	9450	0.0 - 0.5	< 4.7	.8 \pm 0.1	1.2 \pm 0.2
10650	9500	0.0 - 0.5	< 3.6	.9 \pm 0.2	< 1.2
10650	9850	0.0 - 0.5	< 2.4	.9 \pm 0.4	1.1 \pm 0.4
10650	9900	0.0 - 0.5	3.1 \pm 2.1	2.2 \pm 0.7	3.3 \pm 0.8
10670	9690	0.0 - 0.5	< 9.5	< .7	2.7 \pm 1.4
10670	9710	0.0 - 0.5	< 7	2 \pm 0.4	5.4 \pm 0.7
10670	9730	0.0 - 0.5	< 6	1.8 \pm 0.6	5 \pm 1.0
10690	9400	0.0 - 0.5	< 3.1	.8 \pm 0.3	.8 \pm 0.2
10690	9450	0.0 - 0.5	< 3.9	.6 \pm 0.1	.9 \pm 0.3
10690	9740	0.0 - 0.5	< 7.9	1.7 \pm 0.7	2.8 \pm 1.3
10690	9780	0.0 - 0.5	< 9.8	4.6 \pm 0.6	13 \pm 1
10700	9250	0.0 - 0.5	< 4	1.1 \pm 0.7	3.6 \pm 0.6
10700	9505	0.0 - 0.5	< 3	.5 \pm 0.3	1 \pm 0.4
10700	9900	0.0 - 0.5	< 2.9	.8 \pm 0.2	1 \pm 0.3
10700	9950	0.0 - 0.5	< 2	2.9 \pm 0.7	2.5 \pm 0.8

Table C-1

(continued)

Page 9 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
10710	9790	0.0 - 0.5	4.4 \pm 3.4	2.2 \pm 0.4	7.4 \pm 0.9
10730	9520	0.0 - 0.5	< 3.1	.8 \pm 0.4	2.1 \pm 0.4
10730	9700	0.0 - 0.5	< 2	.7 \pm 0.2	1 \pm 0.3
10730	9720	0.0 - 0.5	< 6.3	3 \pm 0.4	13 \pm 1
10730	9760	0.0 - 0.5	< 2.7	1 \pm 0.3	1.7 \pm 0.4
10750	9250	0.0 - 0.5	< 1.9	< .4	1 \pm 0.6
10750	9505	0.0 - 0.5	< 3.4	1.8 \pm 0.4	6.4 \pm 0.7
10750	9850	0.0 - 0.5	< 2.3	.8 \pm 0.3	.9 \pm 0.5
10750	9900	0.0 - 0.5	< 2.3	1 \pm 0.3	1.2 \pm 0.4
10750	9950	0.0 - 0.5	< 6.2	1.5 \pm 0.4	3.7 \pm 0.7
10750	10000	0.0 - 0.5	< 7.7	3.6 \pm 1.3	6 \pm 1.5
10765	9960	0.0 - 0.5	< 10	1.8 \pm 0.9	8.1 \pm 1.3
10775	9880	0.0 - 0.5	< 9.7	1.2 \pm 0.8	8.5 \pm 1.6
10780	9820	0.0 - 0.5	< 4.6	2.7 \pm 0.8	7.5 \pm 1.2
10790	9750	0.0 - 0.5	< 8.9	1.5 \pm 0.5	3.3 \pm 0.8
10790	9770	0.0 - 0.5	< 7.9	3 \pm 0.5	11 \pm 1
10800	9220	0.0 - 0.5	< 2	< .3	< .5
10800	9230	0.0 - 0.5	< 2.3	.9 \pm 0.2	1.6 \pm 0.3
10800	9250	0.0 - 0.5	< 2.5	.8 \pm 0.2	1.6 \pm 0.1
10800	9300	0.0 - 0.5	< 5.1	.7 \pm 0.1	1.1 \pm 0.3
10800	9350	0.0 - 0.5	< 4.6	.6 \pm 0.2	1 \pm 0.3
10800	9400	0.0 - 0.5	< 2.2	< .5	< .8

Table C-1
(continued)

Page 10 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface (cont'd)					
10800	9450	0.0 - 0.5	< 2.4	< .6	< .8
10800	9510	0.0 - 0.5	< 2.6	.7 \pm 0.4	1.7 \pm 0.6
10800	9520	0.0 - 0.5	< 6.1	1.3 \pm 0.5	4 \pm 0.5
10830	9690	0.0 - 0.5	< 8.9	13 \pm 1	54 \pm 2
10830	9710	0.0 - 0.5	12 \pm 7	.6 \pm 0.6	2.1 \pm 1.1
10830	9730	0.0 - 0.5	< 5.7	1.7 \pm 0.5	4.3 \pm 0.8
10850	9218	0.0 - 0.5	< 6.1	1.3 \pm 0.4	2.7 \pm 0.9
10850	9220	0.0 - 0.5	< 2.6	1 \pm 0.4	2.8 \pm 0.3
10850	9230	0.0 - 0.5	< 2.6	.8 \pm 0.3	1.9 \pm 0.8
10850	9595	0.0 - 0.5	< 2.2	.6 \pm 0.3	1.3 \pm 0.4
10850	9740	0.0 - 0.5	< 5.1	2.6 \pm 0.4	6.7 \pm 0.8
10850	9780	0.0 - 0.5	6.1 \pm 4.6	5.1 \pm 0.4	18 \pm 1
10900	9215	0.0 - 0.5	< 2.6	1.0 \pm 0.4	2.8 \pm 0.3
10900	9230	0.0 - 0.5	< 4.5	1 \pm 0.2	2.3 \pm 0.6
10900	9505	0.0 - 0.5	< 2	.8 \pm 0.3	1.6 \pm 0.3
10900	9595	0.0 - 0.5	< 1.9	.7 \pm 0.2	.8 \pm 0.4
10900	9700	0.0 - 0.5	< 5.2	.5 \pm 0.3	1.9 \pm 0.7
10940	9800	0.0 - 0.5	< 8.9	1.4 \pm 0.7	6.4 \pm 2.3
10950	9230	0.0 - 0.5	< 3.4	1.5 \pm 1.0	2.7 \pm 2.0
10950	9505	0.0 - 0.5	< 5.8	1.3 \pm 0.5	2.2 \pm 0.4
10950	9550	0.0 - 0.5	< 3.9	2 \pm 0.4	4.7 \pm 0.7
10950	9600	0.0 - 0.5	< 4.2	2 \pm 0.5	7 \pm 0.5

Table C-1
(continued)

Page 11 of 34

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Surface					
10955	9215	0.0 - 0.5	< 2.4	.5 \pm 0.2	1.3 \pm 0.4
11000	9210	0.0 - 0.5	< 8.1	1.3 \pm 0.4	5.0 \pm 1.4
11000	9215	0.0 - 0.5	< 4.8	1.2 \pm 0.4	3.7 \pm 0.8
11000	9230	0.0 - 0.5	< 6.6	1.9 \pm 0.2	4.8 \pm 1.0
11000	9510	0.0 - 0.5	< 2.7	.9 \pm 0.2	2.8 \pm 0.5
11000	9600	0.0 - 0.5	< 3	1 \pm 0.2	3 \pm 0.5
11050	9210	0.0 - 0.5	< 5.6	.7 \pm 0.4	1.5 \pm 0.5
11050	9215	0.0 - 0.5	< 6.2	1.5 \pm 0.5	5.7 \pm 0.4
11050	9230	0.0 - 0.5	7 \pm 4	1 \pm 0.2	2.9 \pm 0.6
11050	9510	0.0 - 0.5	< 2.8	1.9 \pm 0.5	3.2 \pm 0.4
11050	9550	0.0 - 0.5	< 2.1	.6 \pm 0.1	1.7 \pm 0.6
11090	9550	0.0 - 0.5	< 3	.9 \pm 0.4	1.9 \pm 0.7
11090	9600	0.0 - 0.5	< 6	.8 \pm 0.2	1.5 \pm 0.4
11095	9230	0.0 - 0.5	< 2.4	.7 \pm 0.4	1.6 \pm 0.4
11095	9250	0.0 - 0.5	< 3.1	1.1 \pm 0.3	2.2 \pm 0.3
11100	9600	0.0 - 0.5	< 6	.8 \pm 0.2	1.5 \pm 0.4
11107	9350	0.0 - 0.5	< 1.6	.8 \pm 0.4	1.4 \pm 0.4
11110	9300	0.0 - 0.5	3.1 \pm 3.0	3.4 \pm 0.7	12 \pm 2
11115	9250	0.0 - 0.5	3.3 \pm 0.4	1.2 \pm 0.4	3.8 \pm 0.4

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface						
9800	9550	B3890R118	0.0 - 1.0	< 2.6	1.3 \pm 0.7	1.1 \pm 0.8
			6.0 - 7.0	< 3.2	1.4 \pm 0.5	< 1.5
			14.0 - 15.0	< 1.9	< .5	< .9
9800	9640	B3890R256	0.0 - 1.0	< 4.6	< 1.4	4 \pm 1.2
			5.0 - 6.0	< 2.9	< 1	< 1.6
			9.0 - 10.0	< 5.8	.5 \pm 0.1	.8 \pm 0.2
9800	9650	B3890R711	0.0 - 1.0	< 4.4	1.2 \pm 0.3	4.4 \pm 0.8
			4.0 - 6.0	< 2	1.9 \pm 0.6	2.4 \pm 0.7
			9.0 - 10.0	< 2.9	.8 \pm 0.3	1 \pm 0.3
9800	9700	B3890R117	0.0 - 1.0	< 10	< 1	3.7 \pm 1.9
			1.0 - 2.0	< 17	.7 \pm 0.4	1.5 \pm 0.3
			3.0 - 4.0	< 9.6	< .8	1.8 \pm 1.3
			12.0 - 13.0	< 9.5	1.3 \pm 0.7	1.1 \pm 0.9
9850	9400	B3890R119	0.0 - 1.0	< 3.6	< .8	2.2 \pm 1.2
			3.0 - 4.0	< 5.3	.6 \pm 0.1	1 \pm 0.5
			5.0 - 6.0	< 6	.7 \pm 0.2	1.3 \pm 0.1
9850	9700	B3890R257	0.0 - 1.0	< 3.8	< .9	3.7 \pm 0.2
			2.0 - 3.0	< 4.5	< 1.3	6.5 \pm 1.9
			11.0 - 12.0	< 2.5	< .7	< 1.2
9858	9174	B3890R720	0.0 - 2.0	< 1.6	.8 \pm 0.3	< .7
			2.0 - 3.0	2.1 \pm 1.7	.4 \pm 0.2	.9 \pm 0.4
			3.0 - 4.0	< 6.4	7 \pm 1.1	41 \pm 2
			9.0 - 10.0	< 6.6	1.3 \pm 0.4	1.4 \pm 0.6
9900	9000	B3890R122	0.0 - 1.0	< 4.3	.5 \pm 0.4	< .7
			1.0 - 2.0	< 4.5	1.4 \pm 0.7	2.3 \pm 1.1
			4.0 - 5.0	< 4.1	1 \pm 0.4	1.1 \pm 0.5
			7.0 - 8.0	< 2.4	1 \pm 0.4	1.2 \pm 0.5
9900	9550	B3890R174	0.0 - 1.0	< 4.1	1.9 \pm 0.6	2 \pm 0.9
			5.0 - 6.0	< 3.4	1.5 \pm 0.3	1.4 \pm 0.2
			10.0 - 11.0	< 2.2	.7 \pm 0.2	< .8
9900	9682	B3890R242	0.0 - 1.0	< 1.8	.3 \pm 0.2	.4 \pm 0.3
			3.0 - 4.0	< 2.9	1.7 \pm 0.5	2.1 \pm 0.5
			4.0 - 5.0	< 3.1	.8 \pm 0.2	1.1 \pm 0.2
			10.0 - 12.0	< 3.8	.8 \pm 0.3	1.1 \pm 0.3

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
9900	9700	B3890R123	0.0 - 1.0	< 2	< .5	1 \pm 0.4
			1.0 - 2.0	< 3.3	.5 \pm 0.5	1.1 \pm 0.8
			2.0 - 3.0	< 17	8.7 \pm 1.0	35 \pm 2
			3.0 - 4.0	< 4.9	2.4 \pm 0.9	3.3 \pm 1.2
9900	9725	B3890R240	0.0 - 1.0	< 1.4	.4 \pm 0.2	.8 \pm 0.4
			4.0 - 6.0	2.7 \pm 2.5	.9 \pm 0.3	1.5 \pm 0.5
			9.0 - 10.0	< 2.1	.9 \pm 0.2	.9 \pm 0.4
9905	9910	B3890R173	0.0 - 1.0	< 2.1	.6 \pm 0.1	1.2 \pm 0.2
			4.0 - 5.0	< 4.4	.9 \pm 0.1	1.5 \pm 0.4
			8.0 - 9.0	< 3	.7 \pm 0.2	1.1 \pm 0.3
9922	9171	B3890R244	0.0 - 1.0	< 3.6	2.1 \pm 0.6	8.4 \pm 1.5
			1.0 - 2.0	< 6.5	2.1 \pm 0.2	6 \pm 0.8
			2.0 - 3.0	< 2.6	.7 \pm 0.1	1.1 \pm 0.8
			9.0 - 10.0	< 4.4	.9 \pm 0.3	1.5 \pm 0.3
9925	9700	B3890R241	0.0 - 1.0	< 1.4	< .3	.5 \pm 0.3
			4.0 - 5.0	< 2.3	.9 \pm 0.3	1.9 \pm 0.4
			8.0 - 10.0	< 3.3	1.1 \pm 0.3	1.2 \pm 0.4
9950	9248	B3890R121	0.0 - 1.0	< 4.3	1 \pm 0.6	2.1 \pm 0.7
			1.0 - 2.0	< 6	3.3 \pm 0.8	3 \pm 1.0
			2.0 - 3.0	< 9.2	4.9 \pm 1.3	14 \pm 2
			3.0 - 4.0	< 5.9	.7 \pm 0.3	3.3 \pm 0.8
			11.0 - 12.0	< 2.9	1 \pm 0.5	1.8 \pm 0.8
9950	9400	B3890R120	0.0 - 1.0	< 3.3	1.5 \pm 0.6	2.6 \pm 1.3
			3.0 - 4.0	< 1.6	< .5	< .8
			6.0 - 8.0	< 2.2	< .6	< 1
9972	9174	B3890R718	0.0 - 1.0	< 4.4	1.8 \pm 0.5	6.1 \pm 0.8
			1.0 - 2.0	< 9.5	2.2 \pm 0.6	6.3 \pm 1.0
			2.0 - 3.0	< 2.4	.9 \pm 0.3	.8 \pm 0.4
			7.0 - 8.0	< 3.5	1.3 \pm 0.4	1.9 \pm 0.5
9980	9223	B3890R243	0.0 - 2.0	3 \pm 2	.9 \pm 0.6	2 \pm 0.3
			2.0 - 3.0	< 3.6	2 \pm 0.7	4.6 \pm 0.7
			3.0 - 4.0	< 4.4	.8 \pm 0.3	1 \pm 0.2
			10.0 - 11.0	< 2.9	.8 \pm 0.3	1.3 \pm 0.7
9985	9700	B3890R267	0.0 - 1.0	< 8.6	1.3 \pm 0.2	2.1 \pm 0.6
			2.0 - 3.0	< 5.0	2.6 \pm 0.3	3.1 \pm 2.0

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
9986	9184	HA122	1.5 - 2.0	< 25.2	9.9 \pm 2.3	69.2 \pm 6.6
			2.0 - 2.5	9.8 \pm 12.0	8.6 \pm 0.6	97.2 \pm 11.7
			2.5 - 3.0	< 17.	8.4 \pm 2.9	56.6 \pm 9.6
10000	9100	B3890R177	0.0 - 1.0	< 7.5	2.4 \pm 0.7	9.1 \pm 0.6
			2.0 - 3.0	< 2.9	< .8	< 1.3
			3.0 - 4.0	< 3.4	< .9	1.4 \pm 0.7
10000	9500	B3890R106	0.0 - 2.0	< 5.2	.5 \pm 0.4	.9 \pm 0.5
			4.0 - 5.0	< 2.3	< .4	< .8
			5.0 - 6.0	< 3.4	.6 \pm 0.3	.7 \pm 0.3
			6.0 - 7.0	< 3.4	.5 \pm 0.3	1.1 \pm 0.3
10005	9600	B3890R102	0.0 - 1.0	< 2.5	1 \pm 0.3	< .8
			2.0 - 3.0	< 5.5	1.3 \pm 0.4	1.6 \pm 1.0
			5.0 - 6.0	< 3.7	.8 \pm 0.4	1.6 \pm 0.7
10005	9700	B3890R101	0.0 - 1.0	< 4.7	1.2 \pm 0.4	4.4 \pm 0.7
			1.0 - 2.0	< 6.4	2.7 \pm 1.1	8 \pm 1.6
			2.0 - 3.0	< 6.8	2.2 \pm 0.6	1.8 \pm 0.7
			4.0 - 5.0	< 5.3	1.8 \pm 0.5	4.8 \pm 0.9
			14.0 - 15.0	< 4.2	1 \pm 0.4	1.6 \pm 0.7
10010	9253	B3890R246	0.0 - 1.0	< 2.3	.9 \pm 0.3	1.9 \pm 0.1
			6.0 - 7.0	< 3.3	.3 \pm 0.2	.5 \pm 0.1
			11.0 - 12.0	< 2.2	.6 \pm 0.3	1.1 \pm 0.3
10012	9600	B3890R261	0.0 - 1.0	< 3	< .9	< 1
			2.0 - 3.0	< 2.8	< .7	< 1
			5.0 - 6.0	< 3	.9 \pm 0.5	1.2 \pm 0.6
10012	9722	B3890R259	0.0 - 1.0	< 6.9	2 \pm 0.2	8.2 \pm 1.0
			1.0 - 2.0	< 4.8	< .9	4.5 \pm 0.4
			3.0 - 4.0	< 9.6	< 1.5	4.5 \pm 2.0
			12.0 - 14.0	< 4.8	.8 \pm 0.3	< .9
10012	9741	B3890R260	0.0 - 1.0	< 6.9	2.6 \pm 0.5	5.8 \pm 0.6
			4.0 - 5.0	< 3.7	< 1	< 1.4
			7.0 - 8.0	< 3.1	< .8	< 1.2
			12.0 - 14.0	< 2.1	.5 \pm 0.5	< .9
10020	9135	B2890R113	0.0 - 1.0	< 4.2	1.3 \pm 0.5	1.1 \pm 0.8
			6.0 - 7.0	< 4.2	1.2 \pm 0.5	1.3 \pm 0.7
			12.0 - 14.0	4.6 \pm 4.4	.4 \pm 0.3	1.6 \pm 0.6

Table C-1
(continued)

Page 15 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10035	9278	B3890R283	0.0 - 1.0	< 7.2	< .8	< 1.2
			6.0 - 7.0	< 3.5	< 1.4	< .6
			13.0 - 14.0	< 4.0	< 1.5	< .7
10035	9690	B3890R704	0.0 - 1.0	< 2.8	.9 \pm 0.3	4 \pm 0.7
			1.0 - 2.0	6 \pm 4.6	3 \pm 0.6	14 \pm 1
			3.0 - 4.0	< 6.2	1.8 \pm 0.5	2.4 \pm 0.6
			10.0 - 12.0	< 4	1.2 \pm 0.3	1.4 \pm 0.4
10035	9700	B3890R258	0.0 - 1.0	< 3.2	< .6	3.1 \pm 1.5
			1.0 - 2.0	< 9.6	3.4 \pm 0.6	17 \pm 3.7
			3.0 - 4.0	< 5.4	1.8 \pm 0.3	2.3 \pm 0.9
			11.0 - 12.0	< 3.1	.9 \pm 0.4	< 1.1
10035	9710	B3890R702	0.0 - 1.0	< 2.8	1.6 \pm 0.6	10 \pm 1
			2.0 - 3.0	< 5.2	2.1 \pm 0.5	6.8 \pm 0.9
			3.0 - 4.0	< 5.6	1.8 \pm 0.6	2.3 \pm 0.8
			13.0 - 14.0	< 5.1	1 \pm 0.3	.9 \pm 0.4
10035	9736	B3890R710	0.0 - 1.0	9 \pm 7.6	7.2 \pm 1.1	88 \pm 9
			1.0 - 2.0	< 3.2	2.5 \pm 0.6	11 \pm 1
			2.0 - 4.0	< 4.8	2 \pm 0.6	8.2 \pm 1.3
			12.0 - 14.0	< 3.8	.6 \pm 0.4	.7 \pm 0.2
10024	9203	B3890R278	0.0 - 1.0	< 6.9	< .8	2.2 \pm 1.5
			3.0 - 4.0	< 52.8	8.2 \pm 3.2	185.6 \pm 29.0
			5.0 - 6.0	< 4.9	< .7	< 1
			10.0 - 12.0	< 7.4	< .9	3.8 \pm 1.1
10036	9194	HA121	2.0 - 2.5	< 20.3	8.3 \pm 4.0	76.4 \pm 17.7
			2.5 - 3.0	< 18.6	13.4 \pm 2.9	84.5 \pm 15.2
			3.0 - 3.5	< 9.8	4.4 \pm 1.7	17.5 \pm 2.3
10044	9248	B3890R281	0.0 - 1.0	< 8.8	1.3 \pm 0.3	2.8 \pm 0.6
			1.0 - 2.0	< 7.8	3.2 \pm 0.4	10.1 \pm 0.5
			3.0 - 4.0	< 8.2	3.6 \pm 1.4	5.5 \pm 1.5
			12.0 - 14.0	< 3.1	1.1 \pm 0.6	1.6 \pm 0.7

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10051	9600	B3890R264	0.0 - 1.0	< 4.4	< 1.2	2.2 \pm 0.3
10066	9195	B2890R275	0.0 - 1.0	< 8.9	1 \pm 0.1	2.7 \pm 0.3
			2.0 - 3.0	50.6 \pm 24.4	7.5 \pm 0.7	65.9 \pm 3.9
			4.0 - 5.0	< 2.9	.5 \pm 0.4	< .6
			11.0 - 12.0	< 6.3	< .8	1.3 \pm 0.4
10068	9172	B3890R279	0.0 - 2.0	< 8	1.2 \pm 0.2	3.8 \pm 1.7
			2.0 - 3.0	54.9 \pm 40.9	26.9 \pm 2.6	262.8 \pm 10.8
			4.0 - 5.0	< 6.4	< .8	2 \pm 0.7
			10.0 - 11.0	< 5.7	< .9	< 1.1
			11.0 - 12.0	< 5.8	1.3 \pm 1.3	1.4 \pm 0.6
10069	9600	B3890R265	0.0 - 1.0	< 4.6	< 1	3.4 \pm 0.6
			1.0 - 2.0	< 6.9	2.4 \pm 0.6	8.9 \pm 0.7
10075	9640	B3890R708	0.0 - 2.0	2.4 \pm 1.7	1.8 \pm 0.6	1.9 \pm 0.7
			5.0 - 6.0	< 2.6	1.0 \pm 0.4	1.2 \pm 0.5
			9.0 - 10.0	< 5.2	.8 \pm 0.4	1.5 \pm 0.5
10080	9700	B3890R233	0.0 - 1.0	< 2.3	1.1 \pm 0.3	2.6 \pm 0.4
			7.0 - 8.0	< 3.7	.6 \pm 0.3	.6 \pm 0.4
			12.0 - 14.0	< 2	.6 \pm 0.3	1 \pm 0.3
10086	9206	HA120	2.0 - 2.5	< 4.7	1.9 \pm 0.4	2.4 \pm 0.7
			3.5 - 4.0	< 3.4	< .8	< 1.2
10090	9600	B3890R144	0.0 - 1.0	< 5.9	2.9 \pm 0.8	8.5 \pm 1.7
			1.0 - 2.0	< 9	4 \pm 0.9	21 \pm 1
			2.0 - 3.0	< 6.3	1.8 \pm 0.5	3.5 \pm 1.3
			5.0 - 6.0	< 8.4	1 \pm 0.5	2.9 \pm 1.0
10090	9700	B3890R232	0.0 - 1.0	< 4.4	2.5 \pm 0.5	13 \pm 1
			1.0 - 2.0	3.9 \pm 2.0	2.4 \pm 0.5	6.7 \pm 0.8
			2.0 - 4.0	< 3	1.3 \pm 0.4	2 \pm 0.5
			11.0 - 12.0	< 2.5	.8 \pm 0.3	1 \pm 0.4
10100	9400	B3890R107	0.0 - 1.0	< 4.9	2.5 \pm 0.7	4.3 \pm 1.3
			1.0 - 2.0	6.2 \pm 5.6	2.7 \pm 0.7	2.9 \pm 1.1
			2.0 - 3.0	< 9.4	3.2 \pm 1.1	3.4 \pm 1.1
			3.0 - 4.0	< 4.6	1.1 \pm 0.4	1.3 \pm 0.7
			5.0 - 6.0	4.5 \pm 4.4	.6 \pm 0.4	.6 \pm 0.4
10100	9500	B3890R104	0.0 - 1.0	< 4.8	1.2 \pm 0.4	2.9 \pm 0.7

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10100	9550	B3890R262	0.0 - 1.0	< 6.3	2.5 \pm 0.6	3.7 \pm 1.4
			2.0 - 4.0	< 3.1	1.1 \pm 0.7	< 1.2
			6.0 - 8.0	< 3.7	1.2 \pm 0.4	< 1.3
10100	9600	B3890R245	0.0 - 1.0	< 5.8	1.6 \pm 0.5	5.6 \pm 0.9
10100	9640	B3890R280	0.0 - 1.0	< 7.2	2.7 \pm 0.5	5.6 \pm 1.2
			8.0 - 9.0	< 4.1	< 1.1	< 1.4
			13.0 - 14.0	< 4.4	< 1.1	< 1.5
10100	9700	B3890R103	0.0 - 1.0	< 8.1	6.5 \pm 0.6	23 \pm 1
			1.0 - 2.0	< 4.9	3.4 \pm 1.0	2.7 \pm 1.5
			5.0 - 6.0	< 3	.6 \pm 0.3	.7 \pm 0.4
			9.0 - 10.0	< 3.7	.6 \pm 0.3	.5 \pm 0.4
10111	9241	B3890R282	0.0 - 1.0	< 8.1	< 0.9	2 \pm 0.6
			2.0 - 3.0	< 9.9	2.2 \pm 0.1	4.2 \pm 1.0
			3.0 - 4.0	< 9.9	< 1	5 \pm 1.9
			9.0 - 10.0	< 5.3	< .5	< .9
10120	9700	B3890R235	0.0 - 1.0	< 7	3 \pm 0.7	13.4 \pm 4.0
			1.0 - 2.0	< 5.6	3.2 \pm 0.5	3.9 \pm 0.2
			2.0 - 3.0	< 3.7	< .8	< 1.4
			9.0 - 10.0	< 2.7	< .7	< .9
10120	9710	B3890R236	0.0 - 1.0	< 7.8	4.5 \pm 1.1	14.5 \pm 3.1
			2.0 - 3.0	< 5	< 1.4	< 1.4
			3.0 - 4.0	< 3.8	< 1	< 1.2
			11.0 - 12.0	< 2.6	< .6	< .7
10120	9720	B3890R237	0.0 - 1.0	< 2.4	3 \pm 0.7	2.8 \pm 0.8
			4.0 - 6.0	< 2	1.4 \pm 0.3	2 \pm 0.6
			9.0 - 10.0	< 1.7	.6 \pm 0.2	.5 \pm 0.3
10125	9600	B3890R270	0.0 - 2.0	< 4	< 1	2.3 \pm 1.2
			9.0 - 10.0	< 2.3	< .6	< .8
			14.0 - 15.0	< 2.2	< .5	< .8
10125	9640	B3890R706	0.0 - 1.0	< 3.9	1.2 \pm 0.3	1.4 \pm 0.4
			7.0 - 8.0	< 2	.5 \pm 0.4	< .5
			14.0 - 16.0	< 3.5	.8 \pm 0.3	1.3 \pm 0.5

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10135	9600	B3890R268	1.0 - 2.0	< 2.8	< .7	< 1
			12.0 - 13.0	< 2.7	1.1 \pm 0.2	1.5 \pm 0.4
			15.0 - 16.0	< 3.6	< .9	< 1.3
10136	9217	HA118	1.5 - 2.0	< 4.2	< 1.1	< 1.5
			3.5 - 4.0	< 2.4	< .6	.9 \pm 0.2
10148	9248	B3890R252	0.0 - 1.0	1.6 \pm 1.5	1.2 \pm 0.5	1.3 \pm 0.6
			4.0 - 5.0	< 2.4	.7 \pm 0.3	.9 \pm 0.3
			5.0 - 6.0	< 2.2	1 \pm 0.4	.6 \pm 0.3
10148	9254	B3890R253	0.0 - 2.0	< 1.7	.9 \pm 0.4	1.1 \pm 0.3
			4.0 - 5.0	< 1.8	.7 \pm 0.2	.8 \pm 0.2
			7.0 - 8.0	< 3.9	.6 \pm 0.3	.9 \pm 0.3
10150	9200	B3890R112	0.0 - 1.0	< 5	.7 \pm 0.4	2.8 \pm 0.8
			1.0 - 2.0	< 6.8	1.6 \pm 0.6	5.7 \pm 1.1
			5.0 - 6.0	< 2.8	.6 \pm 0.3	.9 \pm 0.5
			11.0 - 12.0	< 2.3	.8 \pm 0.3	1.2 \pm 0.5
10150	9300	B3890R111	0.0 - 1.0	< 2.6	< .7	< 1
			6.0 - 8.0	< 3.9	.3 \pm 0.1	.5 \pm 0.2
			11.0 - 12.0	< 2.6	.9 \pm 0.2	1.5 \pm 0.4
10150	9710	B3890R238	0.0 - 1.0	< 2.2	2.1 \pm 0.6	3.3 \pm 0.9
			4.0 - 5.0	< 1.9	.7 \pm 0.5	1.2 \pm 0.6
			8.0 - 10.0	2.3 \pm 2.0	.5 \pm 0.2	1.1 \pm 0.4
10186	9226	HA117	1.5 - 2.0	< 13.4	8.6 \pm 3.1	24.5 \pm 3.8
			3.5 - 4.0	< 2.6	< .6	1 \pm 0.2
10200	9400	B3890R108	0.0 - 1.0	< 10	1.3 \pm 0.6	4.5 \pm 0.9
			1.0 - 2.0	< 7.4	2.3 \pm 0.9	3.8 \pm 1.3
			2.0 - 3.0	< 3.5	.8 \pm 0.5	1.8 \pm 0.7
			6.0 - 7.5	< 4.8	.6 \pm 0.4	1.3 \pm 0.6
10201	9477	B3890R249	0.0 - 1.0	< 2.9	1.3 \pm 0.4	4.7 \pm 1.0
			3.0 - 4.0	< 4.1	.8 \pm 0.3	1.3 \pm 0.2
10236	9227	HA116	0.5 - 1.0	< 8.9	15 \pm 1	47 \pm 3
			2.0 - 2.5	< 11	3.2 \pm 0.6	9 \pm 1.2
			3.0 - 3.5	< 3.7	1.9 \pm 0.4	1.5 \pm 0.7
10245	9435	B3890R714	0.0 - 1.0	< 5.2	8.6 \pm 0.6	12 \pm 2

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10250	9243	B3890R709	0.0 - 2.0	< 2.5	1.1 \pm 0.3	2 \pm 0.5
			7.0 - 8.0	< 3.6	.8 \pm 0.2	.7 \pm 0.3
			12.0 - 14.0	< 2.9	.3 \pm 0.2	.5 \pm 0.3
10250	9310	B3890R110	0.0 - 1.0	< 3.1	1.1 \pm 0.4	1.4 \pm 0.6
			2.0 - 4.0	< 7.6	4.9 \pm 0.6	18 \pm 1
			5.0 - 6.0	< 3.5	1.1 \pm 0.6	1.2 \pm 0.6
			9.0 - 10.0	4.2 \pm 3.3	.9 \pm 0.5	1.2 \pm 0.7
			11.0 - 12.0	< 4.4	1.2 \pm 0.4	1.3 \pm 0.5
			12.0 - 13.0	< 2.9	.7 \pm 0.3	1.4 \pm 0.4
		13.0 - 14.0	< 2.4	1 \pm 0.3	1.6 \pm 0.6	
10266	9744	B3890R152	0.0 - 1.0	< 35	44 \pm 4	180 \pm 10
			1.0 - 2.0	< 10	4.1 \pm 1.0	5.3 \pm 1.5
			9.0 - 10.0	< 7.1	1.2 \pm 0.6	2.3 \pm 0.7
10267	9685	B3890R239	0.0 - 1.0	< 2.3	.7 \pm 0.4	2.1 \pm 0.5
			3.0 - 4.0	< 6.3	2.6 \pm 0.5	2.6 \pm 0.7
10273	9245	B3890R705	2.0 - 4.0	< 6.5	1.1 \pm 0.3	2.2 \pm 0.6
			4.0 - 5.0	15 \pm 8	25 \pm 2	78 \pm 3
			6.0 - 7.0	< 3.2	.7 \pm 0.2	2.8 \pm 0.5
			7.0 - 8.0	< 2.8	.7 \pm 0.3	.8 \pm 0.4
			12.0 - 14.0	< 4.4	1 \pm 0.3	1.8 \pm 0.4
10286	9226	HA115	1.0 - 1.5	< 2.8	1.4 \pm 0.5	5.5 \pm 0.9
			3.0 - 3.5	< 5.9	.4 \pm 0.3	1.3 \pm 0.5
10289	9474	B3890R285	0.0 - 1.0	< 19.6	14.4 \pm 0.6	142.3 \pm 11.8
			2.0 - 3.0	4.6 \pm 2.7	1.9 \pm 0.3	4 \pm 0.3
			7.0 - 8.0	< 2.8	1 \pm 0.5	1.3 \pm 0.4
10290	9352	B3890R712	0.0 - 1.0	< 3.2	1.1 \pm 0.4	2.3 \pm 0.8
			3.0 - 4.0	< 6.3	1.3 \pm 0.4	2 \pm 0.2
			7.0 - 8.0	< 4.1	.8 \pm 0.2	3.3 \pm 0.4
10293	9242	B3890R284	0.0 - 2.0	< 5.1	< .6	< .8
			4.0 - 5.0	< 8.5	1.3 \pm 0.7	3.3 \pm 1.0
			6.0 - 7.0	< 23.6	9.7 \pm 1.3	29.5 \pm 2.1
			9.0 - 10.0	< 5.2	< .6	1.1 \pm 0.4
			15.0 - 16.0	< 2.4	< .7	1.6 \pm 0.3
10293	9252	HA106	1.5 - 2.0	< 2.7	.7 \pm 0.3	1 \pm 0.2
			3.0 - 3.5	< 5.3	.9 \pm 0.3	1.3 \pm 0.4

Table C-1

(continued)

Page 20 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)			
East	North			Uranium-238	Radium-226	Thorium-232	
Subsurface (cont'd)							
10300	9325	B3890R115	0.0 - 1.0	< 6.9		5.3 \pm 0.9	21 \pm 2
			1.0 - 2.0	< 8		3.2 \pm 1.3	13 \pm 3
			4.0 - 5.0	< 7.5		1.2 \pm 0.5	4.7 \pm 1.1
			10.0 - 11.0	< 5		.9 \pm 0.4	1.7 \pm 0.5
10300	9352	B3890R292	0.0 - 1.0	< 2.8	< .6		1 \pm 0.5
			3.0 - 4.0	< 2.8	< .5		.8 \pm 0.3
			6.0 - 8.0	< 3.3	< .7		1.1 \pm 0.3
			8.0 - 10.0	< 3.2	.9 \pm 0.9		1.2 \pm 0.4
10300	9410	B3890R109	0.0 - 1.0	< 7.3		1.4 \pm 0.4	3.7 \pm 0.8
			4.0 - 5.0	< 4.6		1.4 \pm 0.4	1.3 \pm 0.9
			9.0 - 10.0	< 3.8		.6 \pm 0.4	1.3 \pm 0.5
10300	9440	B3890R250	0.0 - 1.0	< 4		.7 \pm 0.3	1.7 \pm 0.3
			2.0 - 3.0	5.2 \pm 2.5		2.3 \pm 0.7	4.6 \pm 0.7
			8.0 - 10.0	< 2.8		.9 \pm 0.3	1.2 \pm 0.3
10300	9478	B3890R247	0.0 - 1.0	< 2.2		.7 \pm 0.1	2.2 \pm 0.1
			1.0 - 2.0	< 5.1		3 \pm 1.1	2.1 \pm 0.3
			2.0 - 3.0	< 5.8		1.7 \pm 0.6	2.8 \pm 0.8
			11.0 - 12.0	< 1.7		.2 \pm 0.1	.2 \pm 0.1
10303	9245	B3890R703	0.0 - 1.0	< 2.2		.8 \pm 0.3	1.2 \pm 0.5
			4.0 - 6.0	< 14		16 \pm 1	49 \pm 2
			8.0 - 9.0	< 6.3		3.9 \pm 0.6	12 \pm 1
			10.0 - 12.0	< 5.2		.7 \pm 0.3	1.3 \pm 0.4
10310	9352	B3890R713	0.0 - 1.0	< 4.5		2.3 \pm 0.8	25 \pm 4
			2.0 - 3.0	< 2.9		.5 \pm 0.2	1.2 \pm 0.4
			7.0 - 8.0	< 5.4		.7 \pm 0.3	.9 \pm 0.4
			8.0 - 10.0	< 3.2		.9 \pm 0.9	1.2 \pm 0.4
10325	9245	B3890R707	0.0 - 2.0	< 3.8		1.0 \pm 0.3	1.3 \pm 0.5
			2.0 - 4.0	< 7.6		1.5 \pm 0.4	4.0 \pm 0.8
			10.0 - 12.0	< 2.0		.7 \pm 0.3	.9 \pm 0.6
10325	9435	B3890R715	0.0 - 2.0	< 2.5		2.4 \pm 0.6	2.8 \pm 0.9
			7.0 - 8.0	< 4.9	< .3		.7 \pm 0.4
			13.0 - 15.0	< 3		.7 \pm 0.3	1.2 \pm 0.3
10330	9739	B3890R294	0.0 - 1.0	< 5.5		1.3 \pm 0.3	1.4 \pm 0.5
			3.0 - 4.0	< 2		.5 \pm 0.2	.6 \pm 0.3
			5.0 - 6.0	< 3		.5 \pm 0.3	1 \pm 0.5

Table C-1

(continued)

Page 21 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10336	9226	HA114	0.5 - 1.0	< 7.7	10 \pm 1	31 \pm 2
			1.0 - 1.5	< 6	7.7 \pm 0.9	24 \pm 2
			1.5 - 2.0	14 \pm 8	16 \pm 1	46 \pm 2
			3.5 - 4.0	< 5.7	.7 \pm 0.3	1.1 \pm 0.7
10336	9971	B3890R147	0.0 - 1.0	< 35	190 \pm 10	79 \pm 6
			2.0 - 3.0	< 30	33 \pm 2	45 \pm 4
			5.0 - 6.0	< 31	7 \pm 2.3	83 \pm 5
10337	10003	B3890R295	0.0 - 1.0	< 12	4.1 \pm 0.7	24 \pm 1
			1.0 - 2.0	< 6.4	9.8 \pm 1.2	54 \pm 2
			2.0 - 3.0	< 8.4	4.6 \pm 0.7	23 \pm 1
			3.0 - 4.0	< 4.1	1.6 \pm 0.4	7.2 \pm 0.7
			4.0 - 6.0	< 2.8	1.3 \pm 0.3	2 \pm 0.4
			6.0 - 6.5	< 5.3	.7 \pm 0.3	1.4 \pm 0.4
10340	9485	B3890R289	0.0 - 1.0	< 5.7	.7 \pm 0.4	2.9 \pm 0.5
			7.0 - 8.0	< 2.3	.7 \pm 0.3	.8 \pm 0.4
			13.5 - 14.5	< 2.2	.6 \pm 0.2	.9 \pm 0.3
10340	9490	B3890R288	0.0 - 1.0	< 5.1	1.2 \pm 0.4	4.4 \pm 0.6
			2.0 - 4.0	< 3.1	1.7 \pm 0.5	2 \pm 0.6
10348	10012	B3890R700	0.0 - 1.0	< 13	19 \pm 1	30 \pm 2
			1.0 - 2.0	< 3.8	15 \pm 1	5.5 \pm 0.9
			3.0 - 4.0	< 4.8	1 \pm 0.3	1.6 \pm 0.5
10350	9352	B3890R721	0.0 - 1.0	< 1.9	.6 \pm 0.3	.7 \pm 0.4
			2.0 - 3.0	< 3.9	1.5 \pm 0.4	6 \pm 0.7
			3.0 - 4.0	< 1.9	.7 \pm 0.2	.7 \pm 0.3
			11.0 - 12.0	< 3.2	.9 \pm 0.2	1.1 \pm 0.3
10350	9850	B3890R148	0.0 - 1.0	12 \pm 12	5.9 \pm 0.8	49 \pm 2
			1.0 - 2.0	< 8.3	1.4 \pm 0.5	2.4 \pm 0.9
			2.0 - 3.0	< 5.4	1.4 \pm 0.5	2.1 \pm 0.6
			5.0 - 6.0	< 6.1	1.6 \pm 0.5	1.7 \pm 0.9
10378	9959	B3890R150	0.0 - 1.0	16 \pm 12	2.6 \pm 0.9	32 \pm 3
			2.0 - 3.0	< 6.9	.6 \pm 0.4	< .8
			3.0 - 4.0	< 4.3	.9 \pm 0.4	1.1 \pm 0.5
			6.0 - 8.0	< 5.4	.7 \pm 0.4	1.4 \pm 0.8

Table C-1
(continued)

Page 22 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10380	9440	B3890R251	0.0 - 1.0	< 4.2	.8 \pm 0.3	.9 \pm 0.2
			3.0 - 4.0	< 2	.8 \pm 0.3	2.4 \pm 0.1
10380	9480	B3890R248	0.0 - 1.0	< 1.6	.5 \pm 0.3	1 \pm 0.3
			1.0 - 2.0	< 6.3	1.2 \pm 0.4	4.5 \pm 1.0
			2.0 - 3.0	< 3.5	3 \pm 0.8	14 \pm 3
			9.0 - 10.0	< 2.3	.5 \pm 0.2	1 \pm 0.1
10386	9226	HA112	0.5 - 1.0	9 \pm 5	4.9 \pm 0.8	12 \pm 1
			1.0 - 1.5	6.8 \pm 5.8	5.7 \pm 0.7	14 \pm 1
			1.5 - 2.0	< 9.1	5.8 \pm 0.7	14 \pm 1
			2.0 - 2.5	< 3.9	3.4 \pm 0.5	7.4 \pm 1.0
			3.5 - 4.0	< 5.9	.7 \pm 0.4	.9 \pm 0.4
10389	9922	B3890R722	0.0 - 1.0	< 3.4	1.4 \pm 0.4	3.6 \pm 0.8
			2.0 - 3.0	< 3.3	.8 \pm 0.4	1.3 \pm 0.5
			4.0 - 6.0	< 5	.9 \pm 0.3	1.4 \pm 0.4
10390	9324	B3890R271	0.0 - 1.0	1.7 \pm 0.3	1.1 \pm 0.4	1.9 \pm 0.3
			2.0 - 4.0	< 6	.8 \pm 0.3	1 \pm 0.4
10390	9334	B3890R229	2.0 - 3.0	< 2.6	2.2 \pm 0.2	7 \pm 0.7
			5.0 - 6.0	< 2.9	1.1 \pm 0.5	2.8 \pm 0.5
			6.0 - 8.0	< 2.8	1.1 \pm 0.3	2.8 \pm 0.3
10390	9344	B3890R230	0.0 - 1.0	< 2.5	1.1 \pm 0.4	1.6 \pm 0.4
			8.0 - 9.0	< 2.6	1.6 \pm 0.4	1.7 \pm 0.5
			16.0 - 18.0	< 1.8	.7 \pm 0.2	.6 \pm 0.4
10390	9493	B3890R716	0.0 - 2.0	< 2.9	1.5 \pm 0.4	3.9 \pm 0.6
			3.0 - 4.0	< 4.2	2.2 \pm 0.4	4.8 \pm 0.7
			8.0 - 10.0	< 5.2	.7 \pm 0.3	.9 \pm 0.4
10397	9334	B3890R293	0.0 - 1.0	< 2.1	1 \pm 0.3	1.2 \pm 0.3
			2.0 - 3.0	< 3.2	1.7 \pm 0.4	2.1 \pm 0.4
			4.0 - 4.5	< 5.6	1 \pm 0.3	1.3 \pm 0.6
10400	9400	B3890R717	0.0 - 1.0	< 2.3	.7 \pm 0.3	1 \pm 0.4
			6.0 - 7.0	< 5.5	.8 \pm 0.3	1.8 \pm 0.5
			12.0 - 13.0	3 \pm 2.0	.7 \pm 0.3	1.1 \pm 0.4
10405	9493	B3890R719	0.0 - 1.0	< 9.3	2.1 \pm 0.6	6.5 \pm 1.0
			8.0 - 10.0	< 2.3	.9 \pm 0.2	1.4 \pm 0.4

Table C-1
(continued)

Page 23 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10410	9911	B3890R272	0.0 - 2.0	< 4.3	< 1	3.1 \pm 0.5
			3.0 - 4.0	< 4.2	< 1.1	< 1.4
			5.0 - 6.0	< 3.1	< .9	1.5 \pm 0.8
10411	9781	B3890R231	0.0 - 1.0	< 1.7	.7 \pm 0.3	1.3 \pm 0.6
			2.0 - 3.0	< 2.1	.7 \pm 0.2	.7 \pm 0.3
			5.0 - 6.0	< 2.2	.6 \pm 0.2	.9 \pm 0.4
10418	9267	HA104	0.5 - 1.0	< 3	1.6 \pm 0.4	2.8 \pm 0.3
			2.0 - 2.5	< 4.8	.7 \pm 0.3	.9 \pm 0.1
10418	9757	B3890R151	0.0 - 1.0	< 6.6	1.4 \pm 0.9	2.5 \pm 1.0
			4.0 - 5.0	< 4	.9 \pm 0.4	1.4 \pm 0.7
			7.0 - 8.0	< 7	.4 \pm 0.4	1.3 \pm 0.6
10419	9957	B3890R149	0.0 - 1.0	< 6	1.4 \pm 0.6	2.5 \pm 0.9
			2.0 - 4.0	< 7.1	1.3 \pm 0.6	1.8 \pm 0.9
10425	9598	B3890R155	0.0 - 1.0	< 4.9	1.2 \pm 0.4	2.4 \pm 0.8
			2.0 - 3.0	< 8.4	3 \pm 0.8	3.1 \pm 1.5
			3.0 - 4.0	< 7.9	1.3 \pm 0.4	1.2 \pm 0.8
10436	9225	HA111	1.5 - 2.0	< 3.8	2.4 \pm 0.5	2.7 \pm 0.8
			2.0 - 2.5	< 3.5	1.7 \pm 0.5	3.2 \pm 0.8
			2.5 - 3.0	17 \pm 16	13 \pm 1	29 \pm 2
			3.5 - 4.0	< 9.9	2.8 \pm 0.6	4.1 \pm 0.8
10438	9235	HA105	0.5 - 1.0	< 6.6	2.9 \pm 0.5	9.1 \pm 1.1
			2.5 - 3.0	8.7 \pm 7.4	4.2 \pm 0.8	15 \pm 2
			4.5 - 5.0	< 2.9	1 \pm 0.4	2.8 \pm 0.4
10438	9264	B3890R228	0.0 - 1.0	3.3 \pm 3.1	1.3 \pm 0.5	3.1 \pm 0.7
			6.0 - 7.0	< 1.7	.4 \pm 0.3	.8 \pm 0.2
			10.0 - 12.0	< 3.5	.6 \pm 0.1	.8 \pm 0.1
10440	9300	B3890R291	0.0 - 1.0	< 4.3	1.3 \pm 0.5	2.7 \pm 0.7
			8.0 - 9.0	< 6.5	1.7 \pm 0.5	2.4 \pm 1.0
			16.0 - 18.0	< 3.1	< .7	< .9
10444	9850	B3890R263	0.0 - 1.0	< 6.9	2.1 \pm 0.7	6.2 \pm 0.8
			4.0 - 5.0	< 3.5	< 1	< 1.4
10446	9260	B3890R226	0.0 - 1.0	< 2	.6 \pm 0.1	1.5 \pm 0.6
			5.0 - 6.0	< 2.1	.7 \pm 0.3	1.3 \pm 0.3

C-23

Table C-1
(continued)

Page 24 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10453	9725	B3890R159	0.0 - 1.0	< 4	1.1 \pm 0.5	1 \pm 0.6
			3.0 - 4.0	< 6.3	.6 \pm 0.3	.9 \pm 0.6
			4.0 - 5.0	< 4.4	1.1 \pm 0.6	1.6 \pm 0.6
10454	9746	B3890R724	0.0 - 1.0	< 4.3	1.2 \pm 0.3	2.1 \pm 0.5
			3.0 - 4.0	< 2.1	.5 \pm 0.2	.8 \pm 0.4
			3.0 - 4.0	< 2	.4 \pm 0.2	.6 \pm 0.3
			5.0 - 6.0	< 3.5	.6 \pm 0.3	.8 \pm 0.5
10458	9258	B3890R723	2.0 - 4.0	< 7	8 \pm 1.0	24 \pm 2
			4.0 - 5.0	< 6.6	1.9 \pm 0.5	3.3 \pm 0.8
			5.0 - 6.0	< 3.5	2.8 \pm 0.6	3.1 \pm 0.8
			6.0 - 8.0	< 2.4	1.3 \pm 0.4	2.5 \pm 0.6
			8.0 - 10.0	< 4.2	.6 \pm 0.3	.7 \pm 0.5
			11.0 - 12.0	< 2.2	.9 \pm 0.3	.4 \pm 0.4
10459	9736	B3890C269	0.0 - 2.0	< 5.6	2.6 \pm 0.2	8.4 \pm 1.6
			2.0 - 4.0	< 2.5	.7 \pm 0.2	1 \pm 0.2
			4.0 - 6.0	< 7.2	2 \pm 0.4	4.4 \pm 1.8
			7.0 - 7.5	< 4	1.3 \pm 0.7	2.1 \pm 1.2
10485	9567	B3890R223	0.0 - 1.0	< 4.1	1 \pm 0.2	1.3 \pm 0.3
			3.0 - 4.0	< 2	.8 \pm 0.5	1.6 \pm 0.3
			5.0 - 6.0	< 2	.6 \pm 0.1	.8 \pm 0.1
10486	9224	HA110	2.0 - 2.5	7.3 \pm 6.4	2 \pm 0.5	6 \pm 1.1
			3.5 - 4.0	< 2.8	.7 \pm 0.3	1.1 \pm 0.3
10488	9716	B3890R725	0.0 - 1.0	2.8 \pm 2.4	.8 \pm 0.3	2.5 \pm 0.6
			4.0 - 5.0	< 3.3	1.1 \pm 0.4	1.1 \pm 0.4
			8.0 - 9.0	< 2.2	1 \pm 0.4	1.4 \pm 0.4
10500	9850	B3890R142	0.0 - 1.0	< 5.4	1 \pm 0.5	2 \pm 0.8
10515	9959	B3890R132	0.0 - 2.0	< 3.5	.9 \pm 0.4	.9 \pm 0.4
			3.0 - 4.0	< 2.8	.9 \pm 0.4	1.2 \pm 0.4
			6.0 - 7.0	< 3.2	.8 \pm 0.3	1 \pm 0.4
10515	10000	B3890R131	0.0 - 1.0	< 8	.8 \pm 0.5	1.7 \pm 0.6
			4.0 - 5.0	< 3.1	.9 \pm 0.4	1.4 \pm 0.5
			8.0 - 9.0	< 2.5	.9 \pm 0.4	1.2 \pm 0.5
10520	9755	B3890R726	0.0 - 1.0	4 \pm 2.7	1.4 \pm 0.4	3.4 \pm 0.2
			5.0 - 6.0	< 1.8	.6 \pm 0.3	.9 \pm 0.2

Table C-1
(continued)

Page 25 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10525	10000	B3890R124	0.0 - 1.0	< 5.5	.5 \pm 0.4	1.4 \pm 0.7
			1.0 - 2.0	< 6.8	1.5 \pm 0.6	2.9 \pm 0.8
			3.0 - 4.0	51 \pm 21	69 \pm 5	280 \pm 10
			4.0 - 5.0	< 12	17 \pm 3	63 \pm 5
			5.0 - 6.0	< 32	51 \pm 2	185 \pm 10
10536	9223	HA109	0.5 - 1.0	< 5.4	3.5 \pm 0.6	10 \pm 1
			2.0 - 2.5	< 7.5	< .8	.8 \pm 0.5
			3.5 - 4.0	< 2.6	1.1 \pm 0.3	2.2 \pm 0.5
10550	9950	B3890R133	0.0 - 1.0	< 4.5	.9 \pm 0.4	1 \pm 0.5
			6.0 - 7.0	< 7	.8 \pm 0.3	1.3 \pm 0.6
			10.0 - 11.0	< 4.5	1 \pm 0.4	1.6 \pm 0.6
10550	9957	B3890C298	6.0 - 7.0	< 55	130 \pm 10	520 \pm 10
			7.0 - 8.0	63 \pm 50	170 \pm 6	710 \pm 10
			8.0 - 9.0	< 37	86 \pm 3	310 \pm 10
			9.0 - 10.0	< 34	67 \pm 4	280 \pm 10
			10.0 - 11.0	< 37	43 \pm 2	200 \pm 10
			11.0 - 12.0	< 14	7.6 \pm 1.0	32 \pm 2
10550	9960	B3890R134	0.0 - 1.0	< 3.4	1.1 \pm 0.5	1.8 \pm 0.7
			2.0 - 3.0	< 3.9	1 \pm 0.3	1.8 \pm 0.6
			6.0 - 8.0	< 50	82 \pm 4	330 \pm 10
			10.0 - 12.0	12 \pm 11	12 \pm 2	62 \pm 4
10550	9998	B3890C297	6.0 - 7.0	< 19	15 \pm 2	67 \pm 3
			7.0 - 8.0	< 6.5	1 \pm 0.4	1.1 \pm 0.5
			8.0 - 9.0	< 11	7.2 \pm 0.9	27 \pm 2
			9.0 - 10.0	< 3.6	1.4 \pm 0.8	< 1
			10.0 - 12.0	< 17	7.3 \pm 0.9	35 \pm 2
			12.0 - 13.0	< 7.4	1.8 \pm 0.5	9.3 \pm 0.9
10550	10000	B3890R125	0.0 - 1.0	< 3.5	.6 \pm 0.5	1.7 \pm 0.8
			1.0 - 2.0	< 3.4	1.7 \pm 0.5	2.6 \pm 0.9
			5.0 - 6.0	9.5 \pm 6.4	1.9 \pm 0.7	3.6 \pm 1.5
			6.0 - 7.0	< 6.5	3 \pm 1.0	4.2 \pm 1.6
			7.0 - 8.0	< 4.1	.7 \pm 0.7	1.3 \pm 0.9
			12.0 - 13.0	5.7 \pm 4.5	.6 \pm 0.5	1.8 \pm 0.7
10560	9550	B3890R287	0.0 - 1.0	< 2.1	2.2 \pm 0.4	1.8 \pm 0.4
			2.0 - 3.0	< 6	1.1 \pm 0.4	1.5 \pm 0.1
			5.0 - 6.0	< 2.5	.5 \pm 0.3	.9 \pm 0.2

Table C-1
(continued)

Page 26 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10586	9222	HA108	2.0 - 2.5	< 2.3	.6 \pm 0.3	1.2 \pm 0.4
			3.5 - 4.0	< 4.3	.9 \pm 0.3	1.1 \pm 0.2
10600	9850	B3890R140	0.0 - 2.0	< 4.9	1.2 \pm 0.4	1.2 \pm 0.6
			3.0 - 4.0	< 5.2	.4 \pm 0.4	< 1.1
			5.0 - 6.0	< 2.6	1 \pm 0.3	1.3 \pm 0.4
10600	10000	B3890R126	0.0 - 1.0	< 5.3	.6 \pm 0.4	1.9 \pm 0.6
			2.0 - 3.0	8.1 \pm 0.6	.7 \pm 0.5	2.2 \pm 0.7
			10.0 - 11.0	53 \pm 36	100 \pm 10	440 \pm 10
10605	9640	B3890R286	0.0 - 2.0	< 5.4	1 \pm 0.3	1.2 \pm 0.4
			3.0 - 4.0	< 3.1	.7 \pm 0.4	1.3 \pm 0.5
10620	10019	B3890R135	0.0 - 1.0	< 3.7	< .8	2.6 \pm 0.5
			1.0 - 2.0	< 3	< .7	1.5 \pm 0.2
			3.0 - 4.0	45.3 \pm 29.6	119.6 \pm 0.8	587.5 \pm 18.8
			6.0 - 7.0	< 7.6	8.3 \pm 1.4	36.9 \pm 4.9
			9.0 - 10.0	< 2.8	< .6	1.3 \pm 0.5
10628	9956	B3890R137	0.0 - 1.0	< 3.5	< .9	1.4 \pm 0.4
			3.0 - 4.0	< 2.6	.5 \pm 0.3	< .9
			5.0 - 6.0	< 3	.7 \pm 0.3	1.4 \pm 0.7
10630	10024	B3890R136	0.0 - 1.0	< 3.3	< .7	1.3 \pm 0.3
			2.0 - 3.0	< 2.6	< .6	1 \pm 0.4
			4.0 - 6.0	< 2.4	.5 \pm 0.2	.9 \pm 0.7
10644	9350	B3890R192	0.0 - 1.0	< 2.5	< .7	.8 \pm 0.5
			5.0 - 6.0	< 2.2	.7 \pm 0.4	1.1 \pm 0.5
			9.0 - 10.0	1.9 \pm 1.6	.8 \pm 0.3	.8 \pm 0.4
10650	9440	B3890R274	0.0 - 1.0	< 3.9	1.2 \pm 0.6	1.5 \pm 0.2
			3.0 - 4.0	< 3.1	< .8	< 1.1
			5.0 - 6.0	< 3.2	1.2 \pm 0.2	1.3 \pm 0.6
			6.0 - 7.0	< 3.3	< 1	1.4 \pm 0.7
			7.0 - 8.0	< 4.3	< 1	1.8 \pm 0.6
10650	9450	B3890R273	0.0 - 1.0	< 3.6	1.2 \pm 0.4	1.4 \pm 1.0
			1.0 - 2.0	< 3.5	< 1	1.5 \pm 0.6
			2.0 - 4.0	< 6.7	.9 \pm 0.2	1.2 \pm 0.5
10650	10000	B3890R127	0.0 - 1.0	< 4.5	.9 \pm 0.3	.8 \pm 0.5
			1.0 - 2.0	< 5.2	.9 \pm 0.4	1.5 \pm 0.6
			3.0 - 4.0	< 4.4	.9 \pm 0.3	2.1 \pm 0.6

Table C-1
(continued)

Page 27 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10655	9774	B3890R215	0.0 - 1.0	< 3.4	1.9 \pm 0.4	5.4 \pm 0.7
			4.0 - 5.0	< 1.7	.9 \pm 0.4	1 \pm 0.5
			7.0 - 8.0	< 4.1	.8 \pm 0.3	1 \pm 0.4
10656	9686	B3890R156	0.0 - 1.0	< 4.5	1.2 \pm 0.6	2.8 \pm 1.0
			3.0 - 4.0	< 3.9	.6 \pm 0.4	1.1 \pm 0.5
			5.0 - 6.0	< 5.8	< .6	1.7 \pm 0.9
10657	9720	B3890R165	0.0 - 1.0	< 8.4	3 \pm 0.9	11.7 \pm 1.1
			5.0 - 6.0	< 2.5	< .6	1.1 \pm 0.2
			9.0 - 10.0	< 3.0	< .6	1.2 \pm 0.7
10660	10000	B3890R130	0.0 - 2.0	< 8.2	4.9 \pm 0.8	20 \pm 1
			2.0 - 3.0	< 4.2	.8 \pm 0.4	2.2 \pm 0.7
			4.0 - 5.0	< 6.9	.8 \pm 0.4	2.8 \pm 0.8
10673	9781	B3890R216	0.0 - 1.0	< 3	1 \pm 0.4	3.6 \pm 0.6
			3.0 - 4.0	< 1.8	.5 \pm 0.2	.8 \pm 0.3
			6.0 - 8.0	< 2.4	.4 \pm 0.2	.6 \pm 0.2
10675	10000	B3890R129	0.0 - 1.0	< 3.5	.7 \pm 0.3	.6 \pm 0.5
			3.0 - 4.0	< 3.6	.7 \pm 0.3	.8 \pm 0.6
			6.0 - 7.0	< 4.1	.9 \pm 0.5	.8 \pm 0.7
10677	9685	B3890R162	0.0 - 1.0	< 8.1	2.2 \pm 0.7	2.6 \pm 1.0
			8.0 - 10.0	< 29	36 \pm 3	180 \pm 10
			14.0 - 15.0	< 5.8	1.4 \pm 0.6	3.5 \pm 1.0
10678	9770	B3890R167	0.0 - 2.0	< 8.3	1.7 \pm 0.4	4.5 \pm 1.1
			6.0 - 7.0	20.6 \pm 18.3	189.8 \pm 12.5	1592 \pm 135.2
			13.0 - 14.0	3.7 \pm 3.1	< .6	3.6 \pm 2.0
10680	9721	B3890R166	0.0 - 1.0	< 5.7	< 1.2	4.7 \pm 1.2
			12.0 - 14.0	19.6 \pm 14.7	56.1 \pm 3.0	223.4 \pm 12.5
10684	9663	B3890R214	0.0 - 2.0	< 1.8	< .3	.6 \pm 0.3
			3.0 - 4.0	< 1.9	1 \pm 0.3	1 \pm 0.3
			5.0 - 6.0	< 4.5	1.4 \pm 0.4	2.1 \pm 0.5
10688	9245	B3890R171	0.0 - 2.0	< 3.2	.9 \pm 0.2	1.9 \pm 0.5
			2.0 - 3.0	< 4.7	1.4 \pm 0.7	5 \pm 0.7
			3.0 - 4.0	< 5.7	1.8 \pm 0.7	6.3 \pm 1.1
			14.0 - 16.0	< 2.5	< .6	1.2 \pm 0.5

Table C-1
(continued)

Page 28 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10700	9500	B3890R276	0.0 - 2.0	< 4.9	.9 \pm 0.3	< .9
			4.0 - 5.0	< 6.6	.7 \pm 0.2	.9 \pm 0.2
			7.0 - 8.0	< 2.7	< .7	< 1.1
10700	9686	B3890R161	0.0 - 1.0	< 9.6	1.5 \pm 0.8	3.9 \pm 1.3
			1.0 - 2.0	< 5.4	1 \pm 0.5	2.8 \pm 0.8
			3.0 - 4.0	< 6	9.1 \pm 0.6	4.3 \pm 1.3
10700	9850	B3890R141	0.0 - 1.0	< 7.8	2.1 \pm 0.8	1.5 \pm 1.0
			3.0 - 4.0	< 6.2	1.4 \pm 0.5	1.3 \pm 1.0
			5.0 - 6.0	< 2.2	1.1 \pm 0.3	1.2 \pm 0.4
10700	10000	B3890R128	0.0 - 1.0	< 3	.9 \pm 0.4	1.4 \pm 0.7
			1.0 - 2.0	< 4.1	.9 \pm 0.4	.8 \pm 0.4
			3.0 - 4.0	< 8.1	.9 \pm 0.4	1.3 \pm 0.7
10710	9238	B3890R205	0.0 - 1.0	< 2.3	.7 \pm 0.3	1 \pm 0.4
			2.0 - 3.0	< 8.1	1.7 \pm 0.6	6.9 \pm 1.2
			3.0 - 4.0	< 8.8	2.8 \pm 1.0	7.5 \pm 1.4
10745	10003	B3890C296	2.5 - 3.0	< 2.6	.9 \pm 0.3	1.5 \pm 0.4
			3.0 - 3.5	< 5.6	1.3 \pm 0.4	.7 \pm 0.6
			3.5 - 4.0	< 2.3	1 \pm 0.3	1.4 \pm 0.7
			4.0 - 6.0	< 5	.8 \pm 0.3	1.2 \pm 0.4
			6.0 - 7.0	< 2	.6 \pm 0.3	.8 \pm 0.4
			7.0 - 8.0	< 2.9	1 \pm 0.3	1.4 \pm 0.4
			8.0 - 10.0	< 2.2	.8 \pm 0.2	1.2 \pm 0.4
10746	10000	B3890R138	0.0 - 2.0	< 3.2	.9 \pm 0.6	1.1 \pm 0.8
			4.0 - 5.0	< 2.9	< .6	< .9
			7.0 - 8.0	< 2.9	< .6	< .9
10748	9686	B3890R254	14.0 - 14.8	2 \pm 1.7	.7 \pm 0.3	.9 \pm 0.5
10750	9665	B3890R213	0.0 - 1.0	< 1.5	.7 \pm 0.3	.8 \pm 0.5
			3.0 - 4.0	< 2.5	.7 \pm 0.3	.8 \pm 0.4
10750	9686	B3890R160	0.0 - 1.0	< 6.9	1.6 \pm 0.6	2.5 \pm 1.1
			8.0 - 10.0	76 \pm 47	140 \pm 10	570 \pm 12
			10.0 - 11.0	170 \pm 100	320 \pm 12	1530 \pm 100
10750	9786	B3890R170	0.0 - 1.0	< 7.4	2 \pm 0.4	8.4 \pm 2.6
			1.0 - 2.0	< 6.5	< 1.4	5.9 \pm 1.9
			4.0 - 6.0	< 6.1	< 1.4	4.8 \pm 2.0

Table C-1
(continued)

Page 29 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10750	9950	B3890R139	0.0 - 1.0	< 2.8	.8 \pm 0.1	1.2 \pm 0.9
			3.0 - 4.0	< 2.9	< .5	1 \pm 0.6
			6.0 - 7.0	< 2.5	< .6	< .7
			7.0 - 8.0	< 2.4	< .6	< .7
10755	9237	B3890R204	0.0 - 1.0	< 3.7	.6 \pm 0.4	.9 \pm 0.4
			2.0 - 3.0	< 3	1.6 \pm 0.6	7.7 \pm 1.0
			5.0 - 6.0	< 5.5	.5 \pm 0.3	1.9 \pm 0.7
10756	9791	B3890R219	0.0 - 1.0	< 2.8	1.6 \pm 0.4	3.3 \pm 0.5
			4.0 - 6.0	< 3.7	1.1 \pm 0.3	1.2 \pm 0.5
			6.0 - 8.0	2.3 \pm 1.6	1.1 \pm 0.4	2.7 \pm 0.6
10798	9498	B3890R277	0.0 - 1.0	< 7.9	.8 \pm 0.1	1.3 \pm 0.1
			5.0 - 6.0	< 2.8	< .8	< 1.1
			10.0 - 12.0	< 1.7	< .5	< .8
10800	9220	HA098	1.5 - 2.0	< 4.5	< .8	< 1
			3.0 - 3.5	< 16	4.2 \pm 1.6	25 \pm 3
10800	9665	B3890R211	0.0 - 1.0	1.9 \pm 1.3	.6 \pm 0.3	.8 \pm 0.4
			3.0 - 4.0	< 3.4	.8 \pm 0.3	.9 \pm 0.5
			7.0 - 8.0	< 1.3	.9 \pm 0.4	1.4 \pm 0.5
10800	9683	B3890R163	0.0 - 1.0	< 9.6	3.8 \pm 0.8	8.8 \pm 1.6
			5.0 - 6.0	< 4.6	.7 \pm 0.4	1.5 \pm 0.5
			9.0 - 10.0	< 3.4	1.4 \pm 0.3	1.7 \pm 0.6
10817	9240	B3890R202	0.0 - 1.0	< 3.7	.9 \pm 0.5	1.5 \pm 0.6
			5.0 - 6.0	< 6.2	.7 \pm 0.3	.8 \pm 0.5
			10.0 - 11.0	< 2.5	.8 \pm 0.3	.7 \pm 0.4
10823	9782	B3890R154	0.0 - 2.0	< 16	4.9 \pm 1.4	19 \pm 2
			3.0 - 4.0	67 \pm 42	74 \pm 5	410 \pm 10
			6.0 - 7.0	< 10	1.9 \pm 0.7	3.5 \pm 1.0
			13.0 - 14.0	< 5	1.1 \pm 0.5	1.8 \pm 0.8
10823	9793	B3890R220	0.0 - 1.0	2.8 \pm 2.4	1.7 \pm 0.5	6.9 \pm 1.1
			4.0 - 5.0	< 3.4	.4 \pm 0.2	.4 \pm 0.1
			7.0 - 8.0	< 1.6	.7 \pm 0.2	.9 \pm 0.5
10825	9724	B3890R143	0.0 - 1.0	< 7.4	1.6 \pm 0.7	5.1 \pm 1.2
			10.0 - 11.0	<110	200 \pm 10	890 \pm 16
			15.0 - 16.0	<110	110 \pm 10	820 \pm 16

Table C-1
(continued)

Page 30 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10828	9250	B3890R172	0.0 - 2.0	< 6	2.3 \pm 0.4	7.5 \pm 1.3
			2.0 - 3.0	< 4.6	1.1 \pm 0.4	3.6 \pm 1.3
			13.0 - 14.0	< 2.3	< .5	1 \pm 0.3
10830	9300	B3890R175	0.0 - 2.0	< 3	< .8	1.5 \pm 0.3
			6.0 - 7.0	< 2.3	< .6	< .7
			11.0 - 12.0	< 2.9	< .7	< 1
10831	9350	B3890R176	0.0 - 2.0	< 4	1.1 \pm 0.3	2.3 \pm 0.9
			5.0 - 6.0	< 2.4	< .6	.6 \pm 0.2
			11.0 - 12.0	< 2.1	.7 \pm 0.3	< .9
10832	9400	B3890R178	0.0 - 1.0	< 5.0	1.5 \pm 0.1	2.4 \pm 2.1
			3.0 - 4.0	< 2.6	< .6	< .9
			5.0 - 6.0	< 3.8	< .8	< 1.3
			6.0 - 7.0	< 3.1	< .8	1.2 \pm 0.6
			9.0 - 10.0	< 2.3	< .6	< .8
10850	9218	HA100	1.5 - 2.0	< 1.5	.7 \pm 0.4	1.5 \pm 0.9
			3.0 - 3.5	< 3.2	1 \pm 0.4	1.5 \pm 0.2
10850	9230	AS075	1.0 - 1.5	< 5.1	< 1	2.8 \pm 1.2
			2.0 - 2.5	< 3.4	1.3 \pm 0.1	3.3 \pm 0.1
			3.0 - 3.5	< 3.7	1.4 \pm 0.6	4.1 \pm 0.1
10850	9446	B3890R191	0.0 - 1.0	< 6.7	.7 \pm 0.5	< .8
			8.0 - 9.0	< 2.4	.6 \pm 0.4	1 \pm 0.6
			13.0 - 14.0	< 4.5	.7 \pm 0.4	.9 \pm 0.4
10850	9683	B3890R164	0.0 - 1.0	< 4.5	1.8 \pm 0.4	3.3 \pm 0.8
			4.0 - 5.0	< 5.1	.6 \pm 0.4	1.1 \pm 0.7
			9.0 - 10.0	< 4.1	.5 \pm 0.4	1.1 \pm 0.6
10884	9747	B3890R169	0.0 - 2.0	< 7.7	1.8 \pm 0.9	4.8 \pm 2.2
			4.0 - 5.0	< 4.6	.9 \pm 0.3	1.4 \pm 0.6
			6.0 - 7.0	< 4.2	< .7	1.4 \pm 0.4
			7.0 - 8.0	< 4.3	< .9	2.6 \pm 0.9
10862	9725	B3890R145	0.0 - 1.0	< 7.2	3.3 \pm 0.9	9.1 \pm 1.9
			12.0 - 13.0	114 \pm 92	333 \pm 11	1120 \pm 100
			15.0 - 15.5	< 18	13 \pm 2	48 \pm 3
10869	9686	B3890R153	0.0 - 1.0	< 9.1	1.9 \pm 0.8	5.8 \pm 1.2
			1.0 - 2.0	< 5.8	2.3 \pm 0.7	4.2 \pm 1.5

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10874	9796	B3890R221	0.0 - 1.0	< 4.1	1.6 \pm 0.6	7.3 \pm 1.1
			4.0 - 5.0	< 1.7	.3 \pm 0.3	.5 \pm 0.2
			8.0 - 10.0	< 3.8	.9 \pm 0.2	1.1 \pm 0.1
10877	9779	B3890R146	0.0 - 1.0	< 14	6.3 \pm 1.0	23 \pm 2
			2.0 - 3.0	< 82	80 \pm 6	360 \pm 12
			9.0 - 10.0	< 3.3	.9 \pm 0.4	1.3 \pm 0.8
10880	9670	B3890R210	0.0 - 2.0	< 5.4	1.2 \pm 0.5	2.2 \pm 0.7
			4.0 - 5.0	< 3.5	.6 \pm 0.3	1.1 \pm 0.5
			9.0 - 10.0	< 6.3	.8 \pm 0.3	1.2 \pm 0.6
10884	9787	B3890R168	0.0 - 1.0	< 9	4.1 \pm 0.6	21.8 \pm 1.5
			3.0 - 4.0	< 4.7	< .7	2 \pm 0.7
			7.0 - 8.0	< 4.5	< .7	1.1 \pm 0.7
10900	9215	HA099	1.0 - 1.5	< 3.8	1.0 \pm 0.4	2.3 \pm 0.5
			2.5 - 3.0	< 2.2	.8 \pm 0.4	1.5 \pm 0.6
10900	9230	HA074	0.0 - 0.5	< 4.1	1.2 \pm 1.0	2.3 \pm 1.4
			1.5 - 2.0	< 6.7	.7 \pm 0.1	1.5 \pm 1.3
			3.5 - 4.0	< 4.4	1.2 \pm 0.5	< 1.3
10900	9447	B3890R183	0.0 - 2.0	< 2.8	1.2 \pm 0.5	1.5 \pm 0.7
			6.0 - 7.0	< 3.9	1.1 \pm 0.4	< 1.6
			11.0 - 12.0	< 4.4	< 1	2.2 \pm 0.4
10900	9550	B3890R157	0.0 - 1.0	< 6.8	2.7 \pm 0.8	4.3 \pm 1.1
			4.0 - 5.0	5.5 \pm 5.0	.7 \pm 0.4	.8 \pm 0.8
			7.0 - 8.0	< 5.5	.9 \pm 0.6	1.3 \pm 0.7
10950	9230	AS072	1.0 - 1.5	< 3.5	< 1	3.6 \pm 1.1
			2.0 - 2.5	< 5.4	2 \pm 0.5	7.7 \pm 2.6
			3.0 - 3.5	< 4.1	1.5 \pm 0.5	5.6 \pm 1.7
10950	9450	B3890R184	0.0 - 2.0	< 4.2	1.5 \pm 0.4	5.5 \pm 0.5
			8.0 - 9.0	< 2.2	.8 \pm 0.1	1.4 \pm 0.4
			11.0 - 12.0	< 3	< .8	1.3 \pm 1.0
10955	9215	AS083	1.0 - 1.5	< 5.5	.7 \pm 0.3	.9 \pm 0.5
10985	9460	B3890R201	0.0 - 1.0	< 2.6	1.2 \pm 0.4	3.3 \pm 0.5
			1.0 - 2.0	< 5.5	1.2 \pm 0.4	3.5 \pm 0.7

Table C-1
(continued)

Page 32 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
0990	9460	B3890R200	0.0 - 1.0	< 6.3	< 1	5.5 \pm 1.8
			2.0 - 4.0	< 7.5	2 \pm 0.6	8.5 \pm 0.4
1000	9210	AS091	2.0 - 2.5	< 4.3	1.7 \pm 0.4	2.6 \pm 0.6
			3.5 - 4.0	2.2 \pm 2	1.3 \pm 0.4	1.8 \pm 0.1
1000	9215	AS084	1.5 - 2.0	< 5.5	.9 \pm 0.3	1.1 \pm 0.5
			3.0 - 3.5	< 1.8	.6 \pm 0.3	1 \pm 0.4
1000	9230	AS073	2.5 - 3.0	< 5.4	1.6 \pm 0.2	3.8 \pm 0.7
			3.0 - 3.5	< 8	2.4 \pm 0.5	6.2 \pm 1.4
			3.5 - 4.0	< 5.2	1.2 \pm 0.3	4.3 \pm 0.9
1000	9463	B3890R196	0.0 - 1.0	< 8.4	1.1 \pm 0.7	2 \pm 0.3
			2.0 - 4.0	< 9	3.3 \pm 0.4	12.3 \pm 0.3
1000	9470	B3890R199	0.0 - 1.0	< 8.3	.9 \pm 0.3	2.7 \pm 0.4
			6.0 - 7.0	< 6.4	< 1	< 1.5
			12.0 - 14.0	< 3.3	< .6	1 \pm 0.4
1000	9550	B3890R158	0.0 - 1.0	18 \pm 14	1.2 \pm 0.6	2.6 \pm 1.1
			5.0 - 6.0	< 5	1.4 \pm 0.6	1.7 \pm 0.6
			9.0 - 10.0	< 5.3	.6 \pm 0.4	1.4 \pm 0.7
1001	9453	B3890R179	0.0 - 1.0	< 3.7	1.3 \pm 0.8	3.2 \pm 0.4
			7.0 - 8.0	< 2.4	< .6	< 1
			14.0 - 15.0	< 2.9	< .7	1.3 \pm 1.0
1010	9463	B3890R197	0.0 - 1.0	< 4.9	1.3 \pm 0.3	2.3 \pm 0.8
			5.0 - 6.0	< 3.1	.6 \pm 0.2	< .9
			11.0 - 12.0	< 6.2	.7 \pm 0.2	.8 \pm 0.3
1050	9210	AS092	2.0 - 2.5	< 3.5	1.1 \pm 0.3	1.2 \pm 0.2
			3.5 - 4.0	< 2.6	.7 \pm 0.3	.7 \pm 0.4
1050	9215	AS082	2.0 - 2.5	< 3.2	.8 \pm 0.4	1.2 \pm 0.4
			3.5 - 4.0	< 3.3	.8 \pm 0.3	.8 \pm 0.3
1050	9230	HA071	1.0 - 1.5	< 3.4	< .8	1.3 \pm 0.3
			2.0 - 2.5	< 6.1	1.7 \pm 0.6	3.8 \pm 1.1
			3.0 - 3.5	< 3.9	1.1 \pm 0.5	2.8 \pm 0.3
1087	9497	B3890R195	0.0 - 1.0	< 5.2	1 \pm 0.4	2.1 \pm 0.9

Table C-1
(continued)

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
11093	9307	B3890R185	0.0 - 2.0	< 3.8	< .8	2.8 \pm 0.6
			2.0 - 3.0	< 7.6	3 \pm 0.2	15.7 \pm 3.0
			3.0 - 4.0	< 12.3	6.1 \pm 0.9	30.7 \pm 4.0
			6.0 - 7.0	< 7.6	3.8 \pm 0.6	18.9 \pm 2.5
			13.0 - 14.0	< 2	.6 \pm 0.2	1.1 \pm 0.7
11095	9250	AS081	1.0 - 1.5	< 5	2.1 \pm 0.6	5.1 \pm 0.8
			1.5 - 2.0	< 6.2	1.8 \pm 0.6	6.4 \pm 0.8
			2.0 - 2.5	< 7.9	1.1 \pm 0.4	3.4 \pm 0.8
			2.5 - 3.0	< 5.4	2.8 \pm 0.8	9 \pm 1.1
11095	9350	B3890R186	0.0 - 1.0	< 4.7	1.3 \pm 0.4	3.7 \pm 2.1
			3.0 - 4.0	< 2.9	.8 \pm 0.3	1.6 \pm 0.4
			13.0 - 14.0	< 4.5	< 1	< 1.4
11095	9400	B3890R187	0.0 - 1.0	< 3.6	1 \pm 0.1	2.8 \pm 0.4
			5.0 - 6.0	15.2 \pm 14.1	19.7 \pm 0.9	114.8 \pm 9.4
			14.0 - 15.0	< 13.4	9.6 \pm 0.7	62.1 \pm 8.5
			17.0 - 19.0	< 3.8	< .8	3.6 \pm 0.3
11095	9410	B3890R188	0.0 - 1.0	< 9.9	1 \pm 0.2	2.9 \pm 0.4
			7.0 - 8.0	< 20.6	15.4 \pm 0.8	95.2 \pm 13.7
			14.0 - 15.0	< 9.7	3.8 \pm 0.7	23.1 \pm 2.8
			15.0 - 16.0	< 2.8	< .7	< 1.1
11095	9420	B3890R189	0.0 - 1.0	< 4.2	1.5 \pm 0.8	3.9 \pm 0.5
			3.0 - 4.0	< 4.9	1.6 \pm 0.3	5.6 \pm 0.7
			4.0 - 5.0	< 6.7	2.5 \pm 0.9	10.3 \pm 1.6
			10.5 - 11.0	< 4.2	< 1	2 \pm 0.2
11095	9430	B3890R190	0.0 - 1.0	< 3.4	.8 \pm 0.1	2.3 \pm 0.3
			4.0 - 5.0	< 3.3	< .7	2 \pm 0.8
			10.0 - 10.5	< 3.3	< .8	< 1.3
11095	9450	B3890R181	0.0 - 1.0	< 3.7	1 \pm 0.2	4 \pm 0.9
			3.0 - 4.0	< 3.6	1.9 \pm 0.4	2.3 \pm 0.9
			12.0 - 14.0	< 1.8	< .5	< .7
11095	9470	B3890R198	0.0 - 1.0	< 5.4	1 \pm 0.2	2.9 \pm 1.5
			2.0 - 3.0	< 9.1	2.7 \pm 0.6	22.6 \pm 4.5
			11.0 - 12.0	< 4.5	< .8	1.3 \pm 0.6
11095	9480	B3890R193	0.0 - 1.0	< 39	11 \pm 2	110 \pm 10
			1.0 - 2.0	< 2.9	1.4 \pm 0.7	2.5 \pm 0.7

Table C-1
(continued)

page 34 of 34

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
1095	9497	B3890R194	0.0 - 2.0	< 7.7	3 \pm 1.0	47 \pm 2
			2.0 - 3.0	< 3.9	< .4	1.5 \pm 0.6
			11.0 - 12.0	< 4	.7 \pm 0.3	.4 \pm 0.4
1095	9509	B3890R206	0.0 - 2.0	< 1.9	.7 \pm 0.5	1.1 \pm 0.6
			4.0 - 5.0	< 4.2	.7 \pm 0.3	1.1 \pm 0.5
			7.0 - 8.0	< 4.4	.5 \pm 0.4	.8 \pm 0.7
1107	9350	HA103	2.0 - 2.5	11 \pm 7	1.4 \pm 0.5	2.6 \pm 0.4
			3.5 - 4.0	< 2.1	.8 \pm 0.5	1.3 \pm 0.2
1109	9250	HA101	2.0 - 2.5	< 6.8	.8 \pm 0.3	1.1 \pm 0.3
			3.5 - 4.0	< 1.9	.7 \pm 0.2	1.1 \pm 0.1
1110	9300	HA102	0.5 - 1.0	< 5	3.3 \pm 0.7	12 \pm 1
			3.5 - 4.0	< 5.8	1 \pm 0.3	1.1 \pm 0.4

Table C-2
Downhole Gamma Logging Results
Stepan Property

Page 1 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R118^d</u>			
9800	9550	0.5	14000
9800	9550	1.0	14000
9800	9550	1.5	16000
9800	9550	2.0	19000
9800	9550	2.5	20000
9800	9550	3.0	17000
9800	9550	3.5	16000
9800	9550	4.0	17000
9800	9550	4.5	18000
9800	9550	5.0	18000
9800	9550	5.5	15000
9800	9550	6.0	13000
9800	9550	6.5	11000
9800	9550	7.0	10000
9800	9550	7.5	9000
9800	9550	8.0	9000
9800	9550	8.5	8000
9800	9550	9.0	8000
9800	9550	9.5	8000
9800	9550	10.0	7000
9800	9550	10.5	8000
9800	9550	11.0	7000
9800	9550	11.5	7000
9800	9550	12.0	7000
9800	9550	12.5	9000
9800	9550	13.0	10000
9800	9550	13.5	11000
9800	9550	14.0	11000
<u>Borehole B3890R256^d</u>			
9800	9640	0.5	8000
9800	9640	1.0	9000
9800	9640	1.5	10000
9800	9640	2.0	11000
9800	9640	2.5	8000
9800	9640	3.0	8000
9800	9640	3.5	7000
9800	9640	4.0	7000

Table C-2
(continued)

Page 2 of 108

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R256^d (continued)

9800	9640	4.5	7000
9800	9640	5.0	7000
9800	9640	5.5	8000
9800	9640	6.0	7000
9800	9640	6.5	8000
9800	9640	7.0	7000
9800	9640	7.5	7000
9800	9640	8.0	8000
9800	9640	8.5	7000

Borehole B3890R711

9800	9650	0.5	21000
9800	9650	1.0	25000
9800	9650	1.5	27000
9800	9650	2.0	33000
9800	9650	2.5	25000
9800	9650	3.0	28000
9800	9650	3.5	26000
9800	9650	4.0	23000
9800	9650	4.5	17000
9800	9650	5.0	11000
9800	9650	5.5	8000
9800	9650	6.0	9000
9800	9650	6.5	9000
9800	9650	7.0	10000
9800	9650	7.5	10000
9800	9650	8.0	10000
9800	9650	8.5	11000
9800	9650	9.0	11000
9800	9650	9.5	12000
9800	9650	10.0	11000

Borehole B3890R117^d

9800	9700	0.5	40000
9800	9700	1.0	50000
9800	9700	1.5	34000
9800	9700	2.0	26000
9800	9700	2.5	23000
9800	9700	3.0	19000

Table C-2
(continued)

Page 3 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R117^d</u> (continued)			
9800	9700	3.5	16000
9800	9700	4.0	14000
9800	9700	4.5	12000
9800	9700	5.0	11000
9800	9700	5.5	10000
9800	9700	6.0	9000
9800	9700	6.5	9000
9800	9700	7.0	9000
9800	9700	7.5	9000
9800	9700	8.0	9000
9800	9700	8.5	9000
9800	9700	9.0	10000
9800	9700	9.5	10000
9800	9700	10.0	9000
9800	9700	10.5	10000
9800	9700	11.0	9000
9800	9700	11.5	9000
9800	9700	12.0	9000
9800	9700	12.5	9000
<u>Borehole B3890R119^d</u>			
9850	9400	0.5	14000
9850	9400	1.0	15000
9850	9400	1.5	13000
9850	9400	2.0	12000
9850	9400	2.5	12000
9850	9400	3.0	13000
9850	9400	3.5	13000
9850	9400	4.0	15000
9850	9400	4.5	14000
9850	9400	5.0	14000
<u>Borehole B3890R257</u>			
9850	9700	0.5	11000
9850	9700	1.0	14000
9850	9700	1.5	17000
9850	9700	2.0	20000
9850	9700	2.5	22000
9850	9700	3.0	22000

Table C-2
(continued)

Page 4 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R257 (continued)

9850	9700	3.5	19000
9850	9700	4.0	13000
9850	9700	4.5	10000
9850	9700	5.0	8000
9850	9700	5.5	7000
9850	9700	6.0	7000
9850	9700	6.5	7000
9850	9700	7.0	8000
9850	9700	7.5	9000
9850	9700	8.0	8000
9850	9700	8.5	8000
9850	9700	9.0	8000
9850	9700	9.5	7000
9850	9700	10.0	7000
9850	9700	10.5	8000
9850	9700	11.0	8000
9850	9700	11.5	8000
9850	9700	12.0	8000

Borehole B3890R720

9858	9174	0.5	13000
9858	9174	1.0	18000
9858	9174	1.5	23000
9858	9174	2.0	34000
9858	9174	2.5	30000
9858	9174	3.0	26000
9858	9174	3.5	19000
9858	9174	4.0	13000
9858	9174	4.5	10000
9858	9174	5.0	10000
9858	9174	5.5	10000
9858	9174	6.0	10000
9858	9174	6.5	10000
9858	9174	7.0	11000
9858	9174	7.5	11000
9858	9174	8.0	11000
9858	9174	8.5	11000
9858	9174	9.0	11000
9858	9174	9.5	11000
9858	9174	10.0	10000

Table C-2
(continued)

Page 5 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R122^d</u>			
9900	9000	0.5	13000
9900	9000	1.0	11000
9900	9000	1.5	15000
9900	9000	2.0	19000
9900	9000	2.5	17000
9900	9000	3.0	13000
9900	9000	3.5	12000
9900	9000	4.0	12000
9900	9000	4.5	12000
9900	9000	5.0	13000
9900	9000	5.5	13000
9900	9000	6.0	13000
9900	9000	6.5	13000
9900	9000	7.0	13000
<u>Borehole B3890R174^d</u>			
9900	9550	0.5	13000
9900	9550	1.0	18000
9900	9550	1.5	23000
9900	9550	2.0	25000
9900	9550	2.5	27000
9900	9550	3.0	28000
9900	9550	3.5	27000
9900	9550	4.0	24000
9900	9550	4.5	19000
9900	9550	5.0	13000
9900	9550	5.5	11000
9900	9550	6.0	10000
9900	9550	6.5	10000
9900	9550	7.0	9000
9900	9550	7.5	8000
9900	9550	8.0	8000
9900	9550	8.5	7000
9900	9550	9.0	6000
9900	9550	9.5	6000
<u>Borehole B3890R242^d</u>			
9900	9682	0.5	8000
9900	9682	1.0	8000
9900	9682	1.5	8000

Table C-2
(continued)

Page 6 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R242^d</u> (continued)			
9900	9682	2.0	12000
9900	9682	2.5	16000
9900	9682	3.0	19000
9900	9682	3.5	16000
9900	9682	4.0	11000
9900	9682	4.5	9000
9900	9682	5.0	8000
9900	9682	5.5	8000
9900	9682	6.0	6000
9900	9682	6.5	6000
9900	9682	7.0	7000
9900	9682	7.5	6000
9900	9682	8.0	6000
9900	9682	8.5	6000
9900	9682	9.0	6000
9900	9682	9.5	6000
9900	9682	10.0	5000
9900	9682	10.5	5000
9900	9682	11.0	5000
9900	9682	11.5	4000
9900	9682	12.0	4000
<u>Borehole B3890R173^d</u>			
9900	9705	0.5	11000
9900	9705	1.0	14000
9900	9705	1.5	18000
9900	9705	2.0	29000
9900	9705	2.5	35000
9900	9705	3.0	28000
9900	9705	3.5	17000
9900	9705	4.0	13000
9900	9705	4.5	12000
9900	9705	5.0	11000
9900	9705	5.5	11000
9900	9705	6.0	11000
9900	9705	6.5	10000
9900	9705	7.0	10000
9900	9705	7.5	11000
9900	9705	8.0	11000

Table C-2
(continued)

Page 7 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R240</u>			
9900	9725	0.5	10000
9900	9725	1.0	10000
9900	9725	1.5	14000
9900	9725	2.0	17000
9900	9725	2.5	26000
9900	9725	3.0	29000
9900	9725	3.5	20000
9900	9725	4.0	16000
9900	9725	4.5	13000
9900	9725	5.0	12000
9900	9725	5.5	12000
9900	9725	6.0	12000
9900	9725	6.5	12000
9900	9725	7.0	11000
9900	9725	7.5	11000
9900	9725	8.0	11000
9900	9725	8.5	12000
9900	9725	9.0	13000
9900	9725	9.5	15000
9900	9725	10.0	23000

Borehole B3890R244

9922	9171	0.5	20000
9922	9171	1.0	27000
9922	9171	1.5	32000
9922	9171	2.0	22000
9922	9171	2.5	14000
9922	9171	3.0	11000
9922	9171	3.5	10000
9922	9171	4.0	10000
9922	9171	4.5	11000
9922	9171	5.0	12000
9922	9171	5.5	13000
9922	9171	6.0	12000
9922	9171	6.5	12000
9922	9171	7.0	12000
9922	9171	7.5	11000
9922	9171	8.0	11000
9922	9171	8.5	10000
9922	9171	9.0	9000
9922	9171	9.5	10000
9922	9171	10.0	8000

Table C-2
(continued)

Page 8 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R241^d</u>			
9925	9700	0.5	10000
9925	9700	1.0	10000
9925	9700	1.5	13000
9925	9700	2.0	15000
9925	9700	2.5	20000
9925	9700	3.0	18000
9925	9700	3.5	15000
9925	9700	4.0	15000
9925	9700	4.5	15000
9925	9700	5.0	14000
9925	9700	5.5	13000
9925	9700	6.0	13000
9925	9700	6.5	14000
9925	9700	7.0	14000
9925	9700	7.5	14000
9925	9700	8.0	14000
9925	9700	8.5	16000
9925	9700	9.0	19000
<u>Borehole B3890R121</u>			
9950	9248	0.5	16000
9950	9248	1.0	19000
9950	9248	1.5	25000
9950	9248	2.0	31000
9950	9248	2.5	41000
9950	9248	3.0	35000
9950	9248	3.5	21000
9950	9248	4.0	13000
9950	9248	4.5	11000
9950	9248	5.0	10000
9950	9248	5.5	9000
9950	9248	6.0	9000
9950	9248	6.5	9000
9950	9248	7.0	10000
9950	9248	7.5	10000
9950	9248	8.0	11000
9950	9248	8.5	11000
9950	9248	9.0	11000
9950	9248	9.5	11000

Table C-2
(continued)

Page 9 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R121 (continued)

9950	9248	10.0	12000
9950	9248	10.5	14000
9950	9248	11.0	17000
9950	9248	11.5	17000
9950	9248	12.0	16000

Borehole B3890R120^d

9950	9400	0.5	17000
9950	9400	1.0	16000
9950	9400	1.5	12000
9950	9400	2.0	11000
9950	9400	2.5	12000
9950	9400	3.0	11000
9950	9400	3.5	12000
9950	9400	4.0	12000
9950	9400	4.5	12000
9950	9400	5.0	12000

Borehole B3890R718

9972	9174	0.5	15000
9972	9174	1.0	21000
9972	9174	1.5	37000
9972	9174	2.0	39000
9972	9174	2.5	22000
9972	9174	3.0	15000
9972	9174	3.5	13000
9972	9174	4.0	11000
9972	9174	4.5	12000
9972	9174	5.0	12000
9972	9174	5.5	14000
9972	9174	6.0	13000
9972	9174	6.5	14000
9972	9174	7.0	14000
9972	9174	7.5	14000
9972	9174	8.0	15000

Table C-2
(continued)

Page 10 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R243^d</u>			
9980	9223	0.5	9000
9980	9223	1.0	12000
9980	9223	1.5	19000
9980	9223	2.0	27000
9980	9223	2.5	32000
9980	9223	3.0	23000
9980	9223	3.5	13000
9980	9223	4.0	10000
9980	9223	4.5	9000
9980	9223	5.0	9000
9980	9223	5.5	10000
9980	9223	6.0	10000
9980	9223	6.5	9000
9980	9223	7.0	10000
9980	9223	7.5	9000
9980	9223	8.0	10000
9980	9223	8.5	12000
9980	9223	9.0	14000
9980	9223	9.5	14000
9980	9223	10.0	16000
<u>Borehole B3890R267^d</u>			
9985	9700	1.0	13000
9985	9700	1.5	15000
9985	9700	2.0	18000
9985	9700	2.5	22000
9985	9700	3.0	19000
9985	9700	3.5	16000
9985	9700	4.0	12000
9985	9700	4.5	15000
9985	9700	5.0	15000
<u>Borehole HA122</u>			
9986	9184	0.5	26000
9986	9184	1.0	58000
9986	9184	1.5	138000
9986	9184	2.0	260000
9986	9184	2.5	207000
9986	9184	3.0	50000
9986	9184	3.5	18000

Table C-2
(continued)

Page 11 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R177</u>			
10000	9100	0.5	22000
10000	9100	1.0	27000
10000	9100	1.5	16000
10000	9100	2.0	12000
10000	9100	2.5	11000
10000	9100	3.0	10000
10000	9100	3.5	12000
10000	9100	4.0	13000
<u>Borehole B3890R106^d</u>			
10000	9500	0.5	11000
10000	9500	1.0	11000
10000	9500	1.5	12000
10000	9500	2.0	12000
10000	9500	2.5	12000
10000	9500	3.0	11000
10000	9500	3.5	12000
10000	9500	4.0	11000
10000	9500	4.5	11000
10000	9500	5.0	11000
10000	9500	5.5	10000
10000	9500	6.0	9000
<u>Borehole B3890R102^d</u>			
10005	9600	0.5	8000
10005	9600	1.0	11000
10005	9600	1.5	12000
10005	9600	2.0	14000
10005	9600	2.5	14000
10005	9600	3.0	14000
10005	9600	3.5	13000
<u>Borehole B3890R101^d</u>			
10005	9700	0.5	21000
10005	9700	1.0	27000
10005	9700	1.5	34000
10005	9700	2.0	42000
10005	9700	2.5	33000

Table C-2
(continued)

Page 12 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		

Borehole B3890R101^d (continued)

10005	9700	3.0	25000
10005	9700	3.5	18000
10005	9700	4.0	15000
10005	9700	4.5	13000
10005	9700	5.0	13000
10005	9700	5.5	13000
10005	9700	6.0	13000
10005	9700	6.5	14000
10005	9700	7.0	14000
10005	9700	7.5	14000
10005	9700	8.0	15000
10005	9700	8.5	15000
10005	9700	9.0	15000
10005	9700	9.5	15000
10005	9700	10.0	15000
10005	9700	10.5	15000
10005	9700	11.0	16000
10005	9700	11.5	15000
10005	9700	12.0	15000
10005	9700	12.5	16000
10005	9700	13.0	16000
10005	9700	13.5	14000

Borehole B3890R246

10010	9253	0.5	8000
10010	9253	1.0	10000
10010	9253	1.5	10000
10010	9253	2.0	10000
10010	9253	2.5	10000
10010	9253	3.0	11000
10010	9253	3.5	11000
10010	9253	4.0	11000
10010	9253	4.5	11000
10010	9253	5.0	10000
10010	9253	5.5	13000
10010	9253	6.0	12000
10010	9253	6.5	8000

Table C-2
(continued)

Page 13 of 108

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R246 (continued)

10010	9253	7.0	7000
10010	9253	7.5	7000
10010	9253	8.0	6000
10010	9253	8.5	7000
10010	9253	9.0	7000
10010	9253	9.5	8000
10010	9253	10.0	8000
10010	9253	10.5	8000
10010	9253	11.0	7000
10010	9253	11.5	7000
10010	9253	12.0	8000

Borehole B3890R261^d

10012	9600	0.5	10000
10012	9600	1.0	12000
10012	9600	1.5	13000
10012	9600	2.0	12000
10012	9600	2.5	12000
10012	9600	3.0	12000
10012	9600	3.5	10000
10012	9600	4.0	13000

Borehole B3890R260

10012	9741	0.5	19000
10012	9741	1.0	23000
10012	9741	1.5	27000
10012	9741	2.0	17000
10012	9741	2.5	11000
10012	9741	3.0	8000
10012	9741	3.5	7000
10012	9741	4.0	5000
10012	9741	4.5	7000
10012	9741	5.0	7000
10012	9741	5.5	7000
10012	9741	6.0	7000
10012	9741	6.5	7000
10012	9741	7.0	7000
10012	9741	7.5	7000
10012	9741	8.0	6000
10012	9741	8.5	6000
10012	9741	9.0	6000

Table C-2
(continued)

Page 14 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R260 (continued)</u>			
10012	9741	9.5	7000
10012	9741	10.0	7000
10012	9741	10.5	7000
10012	9741	11.0	8000
10012	9741	11.5	9000
10012	9741	12.0	10000
10012	9741	12.5	10000
10012	9741	13.0	12000
10012	9741	13.5	12000
10012	9741	14.0	12000
<u>Borehole B3890R113^d</u>			
10020	9135	0.5	12000
10020	9135	1.0	16000
10020	9135	1.5	19000
10020	9135	2.0	20000
10020	9135	2.5	16000
10020	9135	3.0	13000
10020	9135	3.5	11000
10020	9135	4.0	11000
10020	9135	4.5	10000
10020	9135	5.0	5000
10020	9135	5.5	8000
10020	9135	6.0	7000
10020	9135	6.5	7000
10020	9135	7.0	6000
10020	9135	7.5	5000
10020	9135	8.0	5000
10020	9135	8.5	6000
10020	9135	9.0	7000
10020	9135	9.5	7000
10020	9135	10.0	8000
10020	9135	10.5	11000
10020	9135	11.0	11000
10020	9135	11.5	10000
10020	9135	12.0	11000
10020	9135	12.5	11000
10020	9135	13.0	11000
10020	9135	13.5	12000

Table C-2
(continued)

Page 15 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R278^d</u>			
10024	9203	0.5	25000
10024	9203	1.0	42000
10024	9203	1.5	61000
10024	9203	2.0	93000
10024	9203	2.5	158000
10024	9203	3.0	236000
10024	9203	3.5	275000
10024	9203	4.0	160000
10024	9203	4.5	54000
10024	9203	5.0	21000
10024	9203	5.5	14000
10024	9203	6.0	12000
10024	9203	6.5	11000
10024	9203	7.0	10000
10024	9203	7.5	9000
10024	9203	8.0	9000
10024	9203	8.5	10000
10024	9203	9.0	12000
10024	9203	9.5	12000
10024	9203	10.0	12000
<u>Borehole B3890R283^d</u>			
10035	9278	0.5	10000
10035	9278	1.0	15000
10035	9278	1.5	19000
10035	9278	2.0	19000
10035	9278	2.5	16000
10035	9278	3.0	14000
10035	9278	3.5	11000
10035	9278	4.0	9000
10035	9278	4.5	9000
10035	9278	5.0	8000
10035	9278	5.5	7000
10035	9278	6.0	7000
10035	9278	6.5	6000
10035	9278	7.0	6000
10035	9278	7.5	6000
10035	9278	8.0	6000
10035	9278	8.5	6000
10035	9278	9.0	6000

Table C-2
(continued)

Page 16 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R283^d</u> (continued)			
10035	9278	9.5	6000
10035	9278	10.0	6000
10035	9278	10.5	6000
10035	9278	11.0	7000
10035	9278	11.5	8000
10035	9278	12.0	9000
10035	9278	12.5	8000
10035	9278	13.0	8000
10035	9278	13.5	8000
<u>Borehole B3890R704</u>			
10035	9690	0.5	38000
10035	9690	1.0	79000
10035	9690	1.5	53000
10035	9690	2.0	28000
10035	9690	2.5	33000
10035	9690	3.0	23000
10035	9690	3.5	19000
10035	9690	4.0	18000
10035	9690	4.5	14000
10035	9690	5.0	12000
10035	9690	5.5	12000
10035	9690	6.0	12000
10035	9690	6.5	12000
10035	9690	7.0	12000
10035	9690	7.5	12000
10035	9690	8.0	11000
10035	9690	8.5	12000
10035	9690	9.0	12000
10035	9690	9.5	12000
10035	9690	10.0	12000
10035	9690	10.5	13000
10035	9690	11.0	14000
10035	9690	11.5	13000
10035	9690	12.0	14000
<u>Borehole B3890R258</u>			
10035	9700	0.5	62000
10035	9700	1.0	67000
10035	9700	1.5	40000
10035	9700	2.0	27000

Table C-2
(continued)

Page 17 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R258 (continued)

10035	9700	2.5	21000
10035	9700	3.0	16000
10035	9700	3.5	14000
10035	9700	4.0	15000
10035	9700	4.5	11000
10035	9700	5.0	9000
10035	9700	5.5	9000
10035	9700	6.0	9000
10035	9700	6.5	9000
10035	9700	7.0	9000
10035	9700	7.5	9000
10035	9700	8.0	9000
10035	9700	8.5	10000
10035	9700	9.0	10000
10035	9700	9.5	11000
10035	9700	10.0	11000
10035	9700	10.5	11000
10035	9700	11.0	12000
10035	9700	11.5	12000
10035	9700	12.0	12000

Borehole B3890R702

10035	9710	0.5	18000
10035	9710	1.0	22000
10035	9710	1.5	39000
10035	9710	2.0	44000
10035	9710	2.5	45000
10035	9710	3.0	30000
10035	9710	3.5	24000
10035	9710	4.0	17000
10035	9710	4.5	13000
10035	9710	5.0	11000
10035	9710	5.5	10000
10035	9710	6.0	9000
10035	9710	6.5	9000
10035	9710	7.0	9000
10035	9710	7.5	9000
10035	9710	8.0	8000
10035	9710	8.5	7000
10035	9710	9.0	8000
10035	9710	9.5	7000

Table C-2
(continued)

Page 18 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R702 (continued)

10035	9710	10.0	8000
10035	9710	10.5	9000
10035	9710	11.0	10000
10035	9710	11.5	10000
10035	9710	12.0	10000
10035	9710	12.5	10000
10035	9710	13.0	10000
10035	9710	13.5	11000
10035	9710	14.0	12000

Borehole B3890R710^d

10035	9736	0.5	90000
10035	9736	1.0	160000
10035	9736	1.5	95000
10035	9736	2.0	74000
10035	9736	2.5	51000
10035	9736	3.0	33000
10035	9736	3.5	19000
10035	9736	4.0	12000
10035	9736	4.5	12000
10035	9736	5.0	10000
10035	9736	5.5	9000
10035	9736	6.0	8000
10035	9736	6.5	8000
10035	9736	7.0	8000
10035	9736	7.5	8000
10035	9736	8.0	9000
10035	9736	8.5	8000
10035	9736	9.0	7000
10035	9736	9.5	7000
10035	9736	10.0	7000
10035	9736	10.5	8000
10035	9736	11.0	8000
10035	9736	11.5	7000
10035	9736	12.0	8000

Borehole HA121

10036	9194	0.5	14000
10036	9194	1.0	29000
10036	9194	1.5	55000
10036	9194	2.0	138000

Table C-2
(continued)

Page 19 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole HA121 (continued)

10036	9194	2.5	235000
10036	9194	3.0	65000
10036	9194	3.5	17000

Borehole B3890R281^d

10044	9248	0.5	23000
10044	9248	1.0	48000
10044	9248	1.5	43000
10044	9248	2.0	41000
10044	9248	2.5	24000
10044	9248	3.0	18000
10044	9248	3.5	16000
10044	9248	4.0	13000
10044	9248	4.5	11000
10044	9248	5.0	9000
10044	9248	5.5	10000
10044	9248	6.0	11000
10044	9248	6.5	10000
10044	9248	7.0	9000
10044	9248	7.5	9000
10044	9248	8.0	8000
10044	9248	8.5	8000
10044	9248	9.0	8000
10044	9248	9.5	9000
10044	9248	10.0	9000
10044	9248	10.5	10000
10044	9248	11.0	12000
10044	9248	11.5	14000
10044	9248	12.0	13000
10044	9248	12.5	13000

Borehole B3890R112

10050	9200	0.5	16000
10050	9200	1.0	22000
10050	9200	1.5	33000
10050	9200	2.0	35000
10050	9200	2.5	22000

Table C-2
(continued)

Page 20 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R112 (continued)

10050	9200	3.0	18000
10050	9200	3.5	16000
10050	9200	4.0	13000
10050	9200	4.5	10000
10050	9200	5.0	10000
10050	9200	5.5	9000
10050	9200	6.0	9000
10050	9200	6.5	10000
10050	9200	7.0	9000
10050	9200	7.5	9000
10050	9200	8.0	8000
10050	9200	8.5	7000
10050	9200	9.0	8000
10050	9200	9.5	10000
10050	9200	10.0	10000
10050	9200	10.5	10000
10050	9200	11.0	10000
10050	9200	11.5	11000
10050	9200	12.0	11000
10050	9200	12.5	11000
10050	9200	13.0	11000
10050	9200	13.5	12000

Borehole B3890R264^d

10051	9600	0.5	14000
10051	9600	1.0	17000
10051	9600	1.5	16000
10051	9600	2.0	14000
10051	9600	2.5	12000

Borehole B3890R275^d

10066	9195	0.5	23000
10066	9195	1.0	26000
10066	9195	1.5	33000
10066	9195	2.0	46000
10066	9195	2.5	68000
10066	9195	3.0	111000
10066	9195	3.5	89000
10066	9195	4.0	37000
10066	9195	4.5	22000

Table C-2
(continued)

Page 21 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R275^d</u> (continued)			
10066	9195	5.0	13000
10066	9195	5.5	11000
10066	9195	6.0	10000
10066	9195	6.5	10000
10066	9195	7.0	11000
10066	9195	7.5	11000
10066	9195	8.0	10000
10066	9195	8.5	10000
10066	9195	9.0	10000
10066	9195	9.5	11000
10066	9195	10.0	11000
10066	9195	10.5	11000
10066	9195	11.0	12000
10066	9195	11.5	13000
<u>Borehole B3890R279^d</u>			
10068	9172	0.5	51000
10068	9172	1.0	78000
10068	9172	1.5	131000
10068	9172	2.0	265000
10068	9172	2.5	411000
10068	9172	3.0	354000
10068	9172	3.5	147000
10068	9172	4.0	58000
10068	9172	4.5	24000
10068	9172	5.0	16000
10068	9172	5.5	13000
10068	9172	6.0	12000
10068	9172	6.5	11000
10068	9172	7.0	11000
10068	9172	7.5	11000
10068	9172	8.0	10000
10068	9172	8.5	9000
10068	9172	9.0	10000
10068	9172	9.5	10000
10068	9172	10.0	11000
10068	9172	10.5	12000

Table C-2
(continued)

Page 22 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R265</u>			
10069	9600	0.5	16000
10069	9600	1.0	34000
10069	9600	1.5	33000
10069	9600	2.0	28000
<u>Borehole B3890R708^d</u>			
10075	9640	0.5	21000
10075	9640	1.0	22000
10075	9640	1.5	22000
10075	9640	2.0	23000
10075	9640	2.5	20000
10075	9640	3.0	19000
10075	9640	3.5	14000
10075	9640	4.0	14000
10075	9640	4.5	11000
10075	9640	5.0	12000
10075	9640	5.5	11000
10075	9640	6.0	12000
10075	9640	6.5	12000
10075	9640	7.0	12000
10075	9640	7.5	11000
10075	9640	8.0	12000
10075	9640	8.5	13000
10075	9640	9.0	13000
10075	9640	9.5	13000
10075	9640	10.0	13000
<u>Borehole B3890R233</u>			
10080	9700	0.5	37000
10080	9700	1.0	38000
10080	9700	1.5	31000
10080	9700	2.0	28000
10080	9700	2.5	24000
10080	9700	3.0	20000
10080	9700	3.5	14000
10080	9700	4.0	13000
10080	9700	4.5	11000
10080	9700	5.0	10000

Table C-2
(continued)

Page 23 of 108

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R233 (continued)

10080	9700	5.5	11000
10080	9700	6.0	11000
10080	9700	6.5	11000
10080	9700	7.0	9000
10080	9700	7.5	9000
10080	9700	8.0	9000
10080	9700	8.5	9000
10080	9700	9.0	9000
10080	9700	9.5	9000
10080	9700	10.0	9000
10080	9700	10.5	10000
10080	9700	11.0	10000
10080	9700	11.5	10000
10080	9700	12.0	11000
10080	9700	12.5	12000
10080	9700	13.0	12000
10080	9700	13.5	12000
10080	9700	14.0	11000
10080	9700	14.5	12000
10080	9700	15.0	14000
10080	9700	15.5	15000
10080	9700	16.0	13000

Borehole HA120

10086	9206	0.5	7000
10086	9206	1.0	10000
10086	9206	1.5	14000
10086	9206	2.0	13000
10086	9206	2.5	8000
10086	9206	3.0	7000
10086	9206	3.5	7000

Borehole B3890R144^d

10090	9600	0.5	17000
10090	9600	1.0	23000
10090	9600	1.5	70000
10090	9600	2.0	54000
10090	9600	2.5	22000

Table C-2
(continued)

Page 24 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R144^d</u> (continued)			
10090	9600	3.0	14000
10090	9600	3.5	12000
10090	9600	4.0	12000
10090	9600	4.5	11000
<u>Borehole B3890R232^d</u>			
10090	9700	0.5	42000
10090	9700	1.0	62000
10090	9700	1.5	51000
10090	9700	2.0	34000
10090	9700	2.5	23000
10090	9700	3.0	16000
10090	9700	3.5	14000
10090	9700	4.0	9000
10090	9700	4.5	7000
10090	9700	5.0	7000
10090	9700	5.5	8000
10090	9700	6.0	11000
10090	9700	6.5	11000
10090	9700	7.0	10000
10090	9700	7.5	10000
10090	9700	8.0	10000
10090	9700	8.5	10000
10090	9700	9.0	11000
10090	9700	9.5	11000
10090	9700	10.0	12000
10090	9700	10.5	13000
10090	9700	11.0	21000
<u>Borehole B3890R107^d</u>			
10100	9400	0.5	18000
10100	9400	1.0	26000
10100	9400	1.5	27000
10100	9400	2.0	27000
10100	9400	2.5	27000
10100	9400	3.0	22000
10100	9400	3.5	17000
10100	9400	4.0	13000

Table C-2
(continued)

Page 25 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R107^d</u> (continued)			
10100	9400	4.5	12000
10100	9400	5.0	11000
10100	9400	5.5	12000
10100	9400	6.0	12000
<u>Borehole B3890R104^d</u>			
10100	9500	0.5	14000
10100	9500	1.0	14000
10100	9500	1.5	12000
10100	9500	2.0	11000
10100	9500	2.5	12000
<u>Borehole B3890R262^d</u>			
10100	9550	0.5	8000
10100	9550	1.0	8000
10100	9550	1.5	11000
10100	9550	2.0	13000
10100	9550	2.5	13000
10100	9550	3.0	13000
10100	9550	3.5	14000
10100	9550	4.0	15000
10100	9550	4.5	13000
10100	9550	5.0	12000
10100	9550	5.5	12000
10100	9550	6.0	12000
<u>Borehole B3890R280^d</u>			
10100	9640	0.5	22000
10100	9640	1.0	36000
10100	9640	1.5	25000
10100	9640	2.0	24000
10100	9640	2.5	25000
10100	9640	3.0	25000
10100	9640	3.5	24000
10100	9640	4.0	19000
10100	9640	4.5	15000
10100	9640	5.0	17000

Table C-2
(continued)

Page 26 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R280^d (continued)

10100	9640	5.5	15000
10100	9640	6.0	13000
10100	9640	6.5	11000
10100	9640	7.0	11000
10100	9640	7.5	11000
10100	9640	8.0	10000
10100	9640	8.5	9000
10100	9640	9.0	9000
10100	9640	9.5	9000
10100	9640	10.0	9000
10100	9640	10.5	11000
10100	9640	11.0	12000
10100	9640	11.5	12000
10100	9640	12.0	12000
10100	9640	12.5	12000
10100	9640	13.0	11000

Borehole B3890R103^d

10100	9700	0.5	37000
10100	9700	1.0	72000
10100	9700	1.5	57000
10100	9700	2.0	18000
10100	9700	2.5	9000
10100	9700	3.0	5000
10100	9700	3.5	4000
10100	9700	4.0	6000
10100	9700	4.5	8000
10100	9700	5.0	8000
10100	9700	5.5	9000
10100	9700	6.0	10000
10100	9700	6.5	10000
10100	9700	7.0	10000
10100	9700	7.5	10000
10100	9700	8.0	10000
10100	9700	8.5	9000
10100	9700	9.0	10000

Table C-2
(continued)

Page 27 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R234</u>			
10110	9700	0.5	23000
10110	9700	1.0	36000
10110	9700	1.5	30000
10110	9700	2.0	22000
10110	9700	2.5	14000
10110	9700	3.0	13000
10110	9700	3.5	8000
10110	9700	4.0	6000
10110	9700	4.5	6000
10110	9700	5.0	7000
10110	9700	5.5	9000
10110	9700	6.0	10000
10110	9700	6.5	10000
10110	9700	7.0	12000
10110	9700	7.5	12000
10110	9700	8.0	13000
10110	9700	8.5	12000
10110	9700	9.0	11000
10110	9700	9.5	12000
10110	9700	10.0	20000

Borehole B3890R282^d

10111	9241	0.5	14000
10111	9241	1.0	16000
10111	9241	1.5	18000
10111	9241	2.0	21000
10111	9241	2.5	36000
10111	9241	3.0	44000
10111	9241	3.5	32000
10111	9241	4.0	21000
10111	9241	4.5	12000
10111	9241	5.0	8000
10111	9241	5.5	7000
10111	9241	6.0	6000
10111	9241	6.5	6000
10111	9241	7.0	7000
10111	9241	7.5	8000
10111	9241	8.0	9000
10111	9241	8.5	9000
10111	9241	9.0	9000
10111	9241	9.5	9000
10111	9241	10.0	8000

Table C-2
(continued)

Page 28 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R235</u>			
10120	9700	0.5	19000
10120	9700	1.0	20000
10120	9700	1.5	40000
10120	9700	2.0	21000
10120	9700	2.5	13000
10120	9700	3.0	12000
10120	9700	3.5	10000
10120	9700	4.0	5000
10120	9700	4.5	4000
10120	9700	5.0	5000
10120	9700	5.5	6000
10120	9700	6.0	6000
10120	9700	6.5	7000
10120	9700	7.0	7000
10120	9700	7.5	8000
10120	9700	8.0	8000
10120	9700	8.5	8000
10120	9700	9.0	8000
10120	9700	9.5	7000
10120	9700	10.0	9000

Borehole B3890R236

10120	9710	0.5	2000
10120	9710	1.0	18000
10120	9710	1.5	26000
10120	9710	2.0	45000
10120	9710	2.5	28000
10120	9710	3.0	14000
10120	9710	3.5	11000
10120	9710	4.0	7000
10120	9710	4.5	4000
10120	9710	5.0	4000
10120	9710	5.5	5000
10120	9710	6.0	6000
10120	9710	6.5	7000
10120	9710	7.0	7000
10120	9710	7.5	7000
10120	9710	8.0	8000
10120	9710	8.5	8000
10120	9710	9.0	9000

Table C-2
(continued)

Page 29 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R236 (continued)

10120	9710	9.5	9000
10120	9710	10.0	9000
10120	9710	10.5	9000
10120	9710	11.0	10000
10120	9710	11.5	9000
10120	9710	12.0	6000

Borehole B3890R237

10120	9720	0.5	18000
10120	9720	1.0	18000
10120	9720	1.5	24000
10120	9720	2.0	25000
10120	9720	2.5	23000
10120	9720	3.0	18000
10120	9720	3.5	12000
10120	9720	4.0	9000
10120	9720	4.5	8000
10120	9720	5.0	7000
10120	9720	5.5	7000
10120	9720	6.0	8000
10120	9720	6.5	8000
10120	9720	7.0	8000
10120	9720	7.5	7000
10120	9720	8.0	7000
10120	9720	8.5	7000
10120	9720	9.0	6000
10120	9720	9.5	5000
10120	9720	10.0	3000

Borehole B3890R706

10125	9640	0.5	15000
10125	9640	1.0	9000
10125	9640	1.5	9000
10125	9640	2.0	9000
10125	9640	2.5	13000
10125	9640	3.0	22000
10125	9640	3.5	27000
10125	9640	4.0	28000
10125	9640	4.5	27000
10125	9640	5.0	24000
10125	9640	5.5	16000

Table C-2
(continued)

Page 30 of 108

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R706 (continued)

10125	9640	6.0	11000
10125	9640	6.5	8000
10125	9640	7.0	7000
10125	9640	7.5	3000
10125	9640	8.0	3000
10125	9640	8.5	4000
10125	9640	9.0	3000
10125	9640	9.5	4000
10125	9640	10.0	5000
10125	9640	10.5	5000
10125	9640	11.0	5000
10125	9640	11.5	7000
10125	9640	12.0	8000
10125	9640	12.5	10000
10125	9640	13.0	9000
10125	9640	13.5	10000
10125	9640	14.0	10000
10125	9640	14.5	11000
10125	9640	15.0	11000
10125	9640	15.5	12000
10125	9640	16.0	12000

Borehole B3890R268

10135	9600	0.5	9000
10135	9600	1.0	10000
10135	9600	1.5	10000
10135	9600	2.0	11000
10135	9600	2.5	13000
10135	9600	3.0	14000
10135	9600	3.5	17000
10135	9600	4.0	17000
10135	9600	4.5	17000
10135	9600	5.0	16000
10135	9600	5.5	14000
10135	9600	6.0	12000
10135	9600	6.5	11000
10135	9600	7.0	11000
10135	9600	7.5	12000
10135	9600	8.0	12000
10135	9600	8.5	12000
10135	9600	9.0	11000
10135	9600	9.5	10000

Table C-2
(continued)

Page 31 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R268 (continued)

10135	9600	10.0	10000
10135	9600	10.5	11000
10135	9600	11.0	11000
10135	9600	11.5	10000
10135	9600	12.0	11000
10135	9600	12.5	11000
10135	9600	13.0	11000
10135	9600	13.5	11000
10135	9600	14.0	12000
10135	9600	14.5	12000
10135	9600	15.0	13000
10135	9600	15.5	13000
10135	9600	16.0	14000

Borehole HA118

10136	9217	0.5	8000
10136	9217	1.0	10000
10136	9217	1.5	13000
10136	9217	2.0	7000
10136	9217	2.5	5000
10136	9217	3.0	6000
10136	9217	3.5	6000

Borehole B3890R252^d

10148	9248	0.5	8000
10148	9248	1.0	9000
10148	9248	1.5	10000
10148	9248	2.0	10000
10148	9248	2.5	7000
10148	9248	3.0	6000
10148	9248	3.5	5000
10148	9248	4.0	4000

Borehole B3890R253^d

10148	9254	0.5	7000
10148	9254	1.0	7000
10148	9254	1.5	9000
10148	9254	2.0	10000
10148	9254	2.5	10000
10148	9254	3.0	8000

Table C-2
(continued)

Page 32 of 108

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R253^d (continued)

10148	9254	3.5	8000
10148	9254	4.0	7000
10148	9254	4.5	7000
10148	9254	5.0	7000
10148	9254	5.5	7000
10148	9254	6.0	6000
10148	9254	6.5	6000
10148	9254	7.0	5000

Borehole B3890R111

10150	9300	0.5	9000
10150	9300	1.0	10000
10150	9300	1.5	17000
10150	9300	2.0	20000
10150	9300	2.5	16000
10150	9300	3.0	13000
10150	9300	3.5	11000
10150	9300	4.0	10000
10150	9300	4.5	9000
10150	9300	5.0	8000
10150	9300	5.5	8000
10150	9300	6.0	7000
10150	9300	6.5	7000
10150	9300	7.0	8000
10150	9300	7.5	9000
10150	9300	8.0	10000
10150	9300	8.5	11000
10150	9300	9.0	11000
10150	9300	9.5	12000
10150	9300	10.0	13000
10150	9300	10.5	13000
10150	9300	11.0	13000
10150	9300	11.5	12000
10150	9300	12.0	13000

Borehole B3890R238^d

10150	9710	0.5	13000
10150	9710	1.0	19000
10150	9710	1.5	19000

Table C-2
(continued)

Page 33 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R238^d</u> (continued)			
10150	9710	2.0	21000
10150	9710	2.5	19000
10150	9710	3.0	13000
10150	9710	3.5	9000
10150	9710	4.0	7000
10150	9710	4.5	9000
10150	9710	5.0	10000
10150	9710	5.5	11000
10150	9710	6.0	11000
10150	9710	6.5	10000
10150	9710	7.0	10000
10150	9710	7.5	10000
10150	9710	8.0	14000
<u>Borehole HA117</u>			
10186	9226	0.5	9000
10186	9226	1.0	14000
10186	9226	1.5	26000
10186	9226	2.0	22000
10186	9226	2.5	10000
10186	9226	3.0	5000
10186	9226	3.5	4000
<u>Borehole B3890R108^d</u>			
10200	9400	0.5	8000
10200	9400	1.0	9000
10200	9400	1.5	12000
10200	9400	2.0	19000
10200	9400	2.5	20000
10200	9400	3.0	18000
10200	9400	3.5	14000
10200	9400	4.0	12000
10200	9400	4.5	12000
10200	9400	5.0	12000
10200	9400	5.5	13000
10200	9400	6.0	14000
10200	9400	6.5	14000

Table C-2
(continued)

Page 34 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R249^d</u>			
10201	9477	0.5	26000
10201	9477	1.0	20000
10201	9477	1.5	13000
10201	9477	2.0	11000
10201	9477	2.5	10000
10201	9477	3.0	11000
10201	9477	3.5	10000
<u>Borehole HA116^d</u>			
10236	9227	0.5	43000
10236	9227	1.0	109000
10236	9227	1.5	101000
10236	9227	2.0	62000
10236	9227	2.5	20000
10236	9227	3.0	6000
10236	9227	3.5	5000
<u>Borehole B3890R714^d</u>			
10245	9435	0.5	185000
10245	9435	1.0	482000
10245	9435	1.5	699000
10245	9435	2.0	768000
10245	9435	2.5	680000
10245	9435	3.0	439000
10245	9435	3.5	278000
10245	9435	4.0	206000
<u>Borehole B3890R709</u>			
10250	9243	0.5	8000
10250	9243	1.0	9000
10250	9243	1.5	11000
10250	9243	2.0	13000
10250	9243	2.5	16000
10250	9243	3.0	16000
10250	9243	3.5	16000
10250	9243	4.0	17000

Table C-2
(continued)

Page 35 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R709 (continued)

10250	9243	4.5	22000
10250	9243	5.0	22000
10250	9243	5.5	24000
10250	9243	6.0	17000
10250	9243	6.5	14000
10250	9243	7.0	11000
10250	9243	7.5	10000
10250	9243	8.0	10000
10250	9243	8.5	10000
10250	9243	9.0	10000
10250	9243	9.5	9000
10250	9243	10.0	8000
10250	9243	10.5	8000
10250	9243	11.0	9000
10250	9243	11.5	8000
10250	9243	12.0	9000
10250	9243	12.5	10000
10250	9243	13.0	12000
10250	9243	13.5	13000
10250	9243	14.0	13000

Borehole B3890R110^d

10250	9310	0.5	10000
10250	9310	1.0	10000
10250	9310	1.5	17000
10250	9310	2.0	22000
10250	9310	2.5	34000
10250	9310	3.0	65000
10250	9310	3.5	66000
10250	9310	4.0	60000
10250	9310	4.5	50000
10250	9310	5.0	32000
10250	9310	5.5	21000
10250	9310	6.0	14000
10250	9310	6.5	12000
10250	9310	7.0	12000
10250	9310	7.5	12000
10250	9310	8.0	14000
10250	9310	8.5	16000

Table C-2
(continued)

Page 36 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R110^d</u> (continued)			
10250	9310	9.0	16000
10250	9310	9.5	16000
10250	9310	10.0	16000
10250	9310	10.5	17000
10250	9310	11.0	17000
10250	9310	11.5	19000
<u>Borehole B3890R152^d</u>			
10266	9744	0.5	57000
10266	9744	1.0	40000
10266	9744	1.5	28000
10266	9744	2.0	29000
10266	9744	2.5	27000
10266	9744	3.0	24000
10266	9744	3.5	22000
10266	9744	4.0	29000
10266	9744	4.5	28000
10266	9744	5.0	25000
10266	9744	5.5	23000
10266	9744	6.0	26000
10266	9744	6.5	27000
10266	9744	7.0	22000
10266	9744	7.5	17000
10266	9744	8.0	15000
<u>Borehole B3890R239^d</u>			
10267	9685	0.5	11000
10267	9685	1.0	14000
10267	9685	1.5	22000
10267	9685	2.0	21000
10267	9685	2.5	19000
10267	9685	3.0	12000
10267	9685	3.5	8000
<u>Borehole B3890R705</u>			
10273	9245	0.5	14000
10273	9245	1.0	13000
10273	9245	1.5	13000

Table C-2
(continued)

Page 37 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R705 (continued)

10273	9245	2.0	14000
10273	9245	2.5	16000
10273	9245	3.0	24000
10273	9245	3.5	37000
10273	9245	4.0	65000
10273	9245	4.5	148000
10273	9245	5.0	190000
10273	9245	5.5	108000
10273	9245	6.0	44000
10273	9245	6.5	28000
10273	9245	7.0	23000
10273	9245	7.5	18000
10273	9245	8.0	14000
10273	9245	8.5	12000
10273	9245	9.0	11000
10273	9245	9.5	10000
10273	9245	10.0	10000
10273	9245	10.5	10000
10273	9245	11.0	11000
10273	9245	11.5	12000
10273	9245	12.0	13000
10273	9245	12.5	13000
10273	9245	13.0	13000
10273	9245	13.5	13000
10273	9245	14.0	10000

Borehole HA115

10286	9226	0.5	22000
10286	9226	1.0	13000
10286	9226	1.5	16000
10286	9226	2.0	15000
10286	9226	2.5	7000
10286	9226	3.0	5000
10286	9226	3.5	5000

Borehole B3890R285^d

10289	9474	0.5	401000
10289	9474	1.0	243000
10289	9474	1.5	96000

Table C-2
(continued)

Page 38 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R285^d</u> (continued)			
10289	9474	2.0	44000
10289	9474	2.5	33000
10289	9474	3.0	29000
10289	9474	3.5	27000
10289	9474	4.0	29000
10289	9474	4.5	24000
10289	9474	5.0	16000
10289	9474	5.5	16000
10289	9474	6.0	16000
10289	9474	6.5	22000
10289	9474	7.0	84000
10289	9474	7.5	105000
<u>Borehole B3890R712^d</u>			
10290	9352	0.5	12000
10290	9352	1.0	23000
10290	9352	1.5	27000
10290	9352	2.0	23000
10290	9352	2.5	19000
10290	9352	3.0	15000
10290	9352	3.5	13000
10290	9352	4.0	11000
10290	9352	4.5	10000
10290	9352	5.0	11000
10290	9352	5.5	12000
10290	9352	6.0	14000
10290	9352	6.5	17000
10290	9352	7.0	21000
10290	9352	7.5	21000
<u>Borehole B3890R284</u>			
10293	9242	0.5	17000
10293	9242	1.0	17000
10293	9242	1.5	22000
10293	9242	2.0	27000
10293	9242	2.5	25000
10293	9242	3.0	22000
10293	9242	3.5	23000
10293	9242	4.0	27000

Table C-2
(continued)

Page 39 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R284 (continued)

10293	9242	4.5	42000
10293	9242	5.0	74000
10293	9242	5.5	167000
10293	9242	6.0	285000
10293	9242	6.5	331000
10293	9242	7.0	348000
10293	9242	7.5	324000
10293	9242	8.0	252000
10293	9242	8.5	108000
10293	9242	9.0	38000
10293	9242	9.5	17000
10293	9242	10.0	10000
10293	9242	10.5	7000
10293	9242	11.0	12000
10293	9242	11.5	10000
10293	9242	12.0	14000
10293	9242	12.5	16000
10293	9242	13.0	19000
10293	9242	13.5	16000
10293	9242	14.0	14000
10293	9242	14.5	15000
10293	9242	15.0	14000
10293	9242	15.5	14000
10293	9242	16.0	14000

Borehole B3890R115^d

10300	9325	0.5	73000
10300	9325	1.0	89000
10300	9325	1.5	75000
10300	9325	2.0	54000
10300	9325	2.5	36000
10300	9325	3.0	29000
10300	9325	3.5	25000
10300	9325	4.0	20000
10300	9325	4.5	16000
10300	9325	5.0	12000
10300	9325	5.5	9000
10300	9325	6.0	9000
10300	9325	6.5	10000
10300	9325	7.0	12000

Table C-2
(continued)

Page 40 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R115^d</u> (continued)			
10300	9325	7.5	13000
10300	9325	8.0	14000
10300	9325	8.5	17000
10300	9325	9.0	16000
10300	9325	9.5	15000
10300	9325	10.0	16000
<u>Borehole B3890C299</u>			
10300	9345	0.5	15000
10300	9345	1.0	21000
10300	9345	1.5	33000
10300	9345	2.0	55000
10300	9345	2.5	76000
10300	9345	3.0	83000
10300	9345	3.5	99000
10300	9345	4.0	74000
10300	9345	4.5	41000
10300	9345	5.0	20000
10300	9345	5.5	13000
10300	9345	6.0	11000
10300	9345	6.5	9000
10300	9345	7.0	10000
10300	9345	7.5	10000
10300	9345	8.0	11000
10300	9345	8.5	10000
10300	9345	9.0	10000
10300	9345	9.5	11000
10300	9345	10.0	11000
<u>Borehole B3890R292^d</u>			
10300	9352	0.5	17000
10300	9352	1.0	27000
10300	9352	1.5	42000
10300	9352	2.0	28000
10300	9352	2.5	19000
10300	9352	3.0	14000
10300	9352	3.5	13000
10300	9352	4.0	13000
10300	9352	4.5	12000

Table C-2
(continued)

Page 41 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R292^d</u> (continued)			
10300	9352	5.0	11000
10300	9352	5.5	12000
10300	9352	6.0	11000
10300	9352	6.5	11000
10300	9352	7.0	11000
10300	9352	7.5	12000
10300	9352	8.0	12000
10300	9352	8.5	12000
<u>Borehole B3890R109</u>			
10300	9410	0.5	16000
10300	9410	1.0	19000
10300	9410	1.5	20000
10300	9410	2.0	16000
10300	9410	2.5	16000
10300	9410	3.0	16000
10300	9410	3.5	15000
10300	9410	4.0	15000
10300	9410	4.5	15000
10300	9410	5.0	14000
10300	9410	5.5	11000
10300	9410	6.0	10000
10300	9410	6.5	10000
10300	9410	7.0	8000
10300	9410	7.5	8000
10300	9410	8.0	9000
10300	9410	8.5	10000
10300	9410	9.0	8000
10300	9410	9.5	9000
10300	9410	10.0	9000
<u>Borehole B3890C701</u>			
10300	9420	0.5	14000
10300	9420	1.0	25000
10300	9420	1.5	26000
10300	9420	2.0	26000
10300	9420	2.5	26000
10300	9420	3.0	24000
10300	9420	3.5	22000

Table C-2
(continued)

Page 42 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890C701 (continued)</u>			
10300	9420	4.0	21000
10300	9420	4.5	20000
10300	9420	5.0	14000
10300	9420	5.5	12000
10300	9420	6.0	11000
10300	9420	6.5	11000
10300	9420	7.0	11000
10300	9420	7.5	9000
10300	9420	8.0	9000
10300	9420	8.5	9000
10300	9420	9.0	9000
10300	9420	9.5	8000
10300	9420	10.0	10000
<u>Borehole B3890R250</u>			
10300	9440	0.5	18000
10300	9440	1.0	22000
10300	9440	1.5	26000
10300	9440	2.0	25000
10300	9440	2.5	22000
10300	9440	3.0	22000
10300	9440	3.5	22000
10300	9440	4.0	17000
10300	9440	4.5	13000
10300	9440	5.0	11000
10300	9440	5.5	11000
10300	9440	6.0	10000
10300	9440	6.5	11000
10300	9440	7.0	11000
10300	9440	7.5	11000
10300	9440	8.0	12000
10300	9440	8.5	12000
10300	9440	9.0	14000
10300	9440	9.5	14000
10300	9440	10.0	14000
<u>Borehole B3890R247^d</u>			
10300	9478	0.5	45000
10300	9478	1.0	64000
10300	9478	1.5	65000

Table C-2
(continued)

Page 43 of 108

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R247^d (continued)

10300	9478	2.0	39000
10300	9478	2.5	27000
10300	9478	3.0	24000
10300	9478	3.5	21000
10300	9478	4.0	19000
10300	9478	4.5	18000
10300	9478	5.0	15000
10300	9478	5.5	12000
10300	9478	6.0	10000
10300	9478	6.5	9000
10300	9478	7.0	8000
10300	9478	7.5	8000
10300	9478	8.0	9000
10300	9478	8.5	8000
10300	9478	9.0	8000
10300	9478	9.5	7000
10300	9478	10.0	7000
10300	9478	10.5	7000
10300	9478	11.0	6000

Borehole B3890R703

10303	9245	0.5	41000
10303	9245	1.0	33000
10303	9245	1.5	30000
10303	9245	2.0	31000
10303	9245	2.5	33000
10303	9245	3.0	43000
10303	9245	3.5	68000
10303	9245	4.0	103000
10303	9245	4.5	196000
10303	9245	5.0	272000
10303	9245	5.5	333000
10303	9245	6.0	306000
10303	9245	6.5	282000
10303	9245	7.0	242000
10303	9245	7.5	133000
10303	9245	8.0	57000
10303	9245	8.5	27000
10303	9245	9.0	15000
10303	9245	9.5	10000

Table C-2
(continued)

Page 44 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R703 (continued)

10303	9245	10.0	12000
10303	9245	10.5	14000
10303	9245	11.0	16000
10303	9245	11.5	22000
10303	9245	12.0	20000

Borehole B3890R713^d

10310	9352	0.5	20000
10310	9352	1.0	53000
10310	9352	1.5	76000
10310	9352	2.0	59000
10310	9352	2.5	29000
10310	9352	3.0	17000
10310	9352	3.5	13000
10310	9352	4.0	10000
10310	9352	4.5	10000
10310	9352	5.0	9000
10310	9352	5.5	10000
10310	9352	6.0	10000
10310	9352	6.5	12000
10310	9352	7.0	12000
10310	9352	7.5	12000
10310	9352	8.0	12000
10310	9352	8.5	12000
10310	9352	9.0	11000
10310	9352	9.5	11000
10310	9352	10.0	11000

Borehole B3890R707

10325	9245	0.5	9000
10325	9245	1.0	12000
10325	9245	1.5	13000
10325	9245	2.0	16000
10325	9245	2.5	21000
10325	9245	3.0	26000
10325	9245	3.5	24000
10325	9245	4.0	18000
10325	9245	4.5	15000
10325	9245	5.0	13000
10325	9245	5.5	15000
10325	9245	6.0	16000

Table C-2
(continued)

Page 45 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R707 (continued)

10325	9245	6.5	15000
10325	9245	7.0	12000
10325	9245	7.5	11000
10325	9245	8.0	11000
10325	9245	8.5	11000
10325	9245	9.0	10000
10325	9245	9.5	10000
10325	9245	10.0	10000
10325	9245	10.5	10000
10325	9245	11.0	10000
10325	9245	11.5	10000
10325	9245	12.0	10000

Borehole B3890R715

10325	9435	0.5	13000
10325	9435	1.0	18000
10325	9435	1.5	21000
10325	9435	2.0	23000
10325	9435	2.5	24000
10325	9435	3.0	24000
10325	9435	3.5	23000
10325	9435	4.0	21000
10325	9435	4.5	19000
10325	9435	5.0	13000
10325	9435	5.5	10000
10325	9435	6.0	9000
10325	9435	6.5	9000
10325	9435	7.0	9000
10325	9435	7.5	9000
10325	9435	8.0	8000
10325	9435	8.5	8000
10325	9435	9.0	7000
10325	9435	9.5	7000
10325	9435	10.0	7000
10325	9435	10.5	8000
10325	9435	11.0	8000
10325	9435	11.5	9000
10325	9435	12.0	9000
10325	9435	12.5	9000
10325	9435	13.0	11000
10325	9435	13.5	13000
10325	9435	14.5	14000

Table C-2
(continued)

Page 46 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R294</u>			
10330	9739	0.5	14000
10330	9739	1.0	14000
10330	9739	1.5	14000
10330	9739	2.0	14000
10330	9739	2.5	12000
10330	9739	3.0	12000
10330	9739	3.5	13000
10330	9739	4.0	13000
10330	9739	4.5	13000
10330	9739	5.0	11000
10330	9739	5.5	13000
10330	9739	6.0	13000
<u>Borehole HA114</u>			
10336	9226	0.5	66000
10336	9226	1.0	129000
10336	9226	1.5	127000
10336	9226	2.0	104000
10336	9226	2.5	26000
10336	9226	3.0	10000
10336	9226	3.5	7000
<u>Borehole B3890R147^d</u>			
10336	9971	0.5	203000
10336	9971	1.0	264000
10336	9971	1.5	248000
10336	9971	2.0	257000
10336	9971	2.5	234000
10336	9971	3.0	150000
10336	9971	3.5	114000
10336	9971	4.0	106000
10336	9971	4.5	136000
10336	9971	5.0	175000
10336	9971	5.5	115000
<u>Borehole B3890R295^d</u>			
10337	10003	0.5	92000
10337	10003	1.0	166000
10337	10003	1.5	214000

Table C-2
(continued)

Page 47 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R295^d</u> (continued)			
10337	10003	2.5	191000
10337	10003	3.0	148000
10337	10003	3.5	89000
10337	10003	4.0	47000
10337	10003	4.5	28000
10337	10003	5.0	22000
10337	10003	5.5	25000
10337	10003	6.0	33000
<u>Borehole B3890R289</u>			
10340	9485	0.5	13000
10340	9485	1.0	20000
10340	9485	1.5	18000
10340	9485	2.0	17000
10340	9485	2.5	21000
10340	9485	3.0	22000
10340	9485	3.5	21000
10340	9485	4.0	22000
10340	9485	4.5	25000
10340	9485	5.0	27000
10340	9485	5.5	24000
10340	9485	6.0	16000
10340	9485	6.5	13000
10340	9485	7.0	11000
10340	9485	7.5	10000
10340	9485	8.0	10000
10340	9485	8.5	10000
10340	9485	9.0	10000
10340	9485	9.5	11000
10340	9485	10.0	11000
10340	9485	10.5	11000
10340	9485	11.0	11000
10340	9485	11.5	11000
10340	9485	12.0	11000
10340	9485	12.5	11000
10340	9485	13.0	10000
10340	9485	13.5	10000
10340	9485	14.0	10000
10340	9485	14.5	10000
10340	9485	15.0	9000

Table C-2
(continued)

Page 48 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R700</u>			
10348	10012	0.5	153000
10348	10012	1.0	167000
10348	10012	1.5	62000
10348	10012	2.0	32000
10348	10012	2.5	20000
10348	10012	3.0	15000
10348	10012	3.5	13000
10348	10012	4.0	15000
10348	10012	4.5	11000
<u>Borehole B3890R721</u>			
10350	9352	0.5	12000
10350	9352	1.0	17000
10350	9352	1.5	30000
10350	9352	2.0	59000
10350	9352	2.5	79000
10350	9352	3.0	33000
10350	9352	3.5	20000
10350	9352	4.0	14000
10350	9352	4.5	14000
10350	9352	5.0	12000
10350	9352	5.5	9000
10350	9352	6.0	9000
10350	9352	6.5	8000
10350	9352	7.0	8000
10350	9352	7.5	9000
10350	9352	8.0	9000
10350	9352	8.5	9000
10350	9352	9.0	9000
10350	9352	9.5	9000
10350	9352	10.0	8000
10350	9352	10.5	8000
10350	9352	11.0	7000
10350	9352	11.5	10000
10350	9352	12.0	11000
<u>Borehole B3890R148^d</u>			
10350	9850	0.5	57000
10350	9850	1.0	96000
10350	9850	1.5	91000
10350	9850	2.0	44000

Table C-2
(continued)

Page 49 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R148^d</u> (continued)			
10350	9850	2.5	29000
10350	9850	3.0	22000
10350	9850	3.5	18000
10350	9850	4.0	18000
10350	9850	4.5	18000
10350	9850	5.0	28000
10350	9850	5.5	30000
<u>Borehole B3890R150</u>			
10378	9959	0.5	50000
10378	9959	1.0	49000
10378	9959	1.5	63000
10378	9959	2.0	127000
10378	9959	2.5	83000
10378	9959	3.0	43000
10378	9959	3.5	23000
10378	9959	4.0	16000
10378	9959	4.5	16000
10378	9959	5.0	15000
10378	9959	5.5	14000
10378	9959	6.0	15000
10378	9959	6.5	15000
<u>Borehole B3890R251^d</u>			
10380	9440	0.5	8000
10380	9440	1.0	7000
10380	9440	1.5	10000
10380	9440	2.0	13000
10380	9440	2.5	8000
10380	9440	3.0	14000
10380	9440	3.5	14000
<u>Borehole B3890R248</u>			
10380	9480	0.5	19000
10380	9480	1.0	31000
10380	9480	1.5	42000
10380	9480	2.0	39000
10380	9480	2.5	24000
10380	9480	3.0	20000

Table C-2
(continued)

Page 50 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R248 (continued)</u>			
10380	9480	4.0	16000
10380	9480	4.5	13000
10380	9480	5.0	10000
10380	9480	5.5	9000
10380	9480	6.0	9000
10380	9480	6.5	9000
10380	9480	7.0	9000
10380	9480	7.5	8000
10380	9480	8.0	9000
10380	9480	8.5	9000
10380	9480	9.0	9000
10380	9480	9.5	9000
10380	9480	10.0	9000
<u>Borehole HA112</u>			
10386	9226	0.5	59000
10386	9226	1.0	70000
10386	9226	1.5	93000
10386	9226	2.0	62000
10386	9226	2.5	24000
10386	9226	3.0	10000
10386	9226	3.5	7000
<u>Borehole B3890R722</u>			
10389	9922	0.5	22000
10389	9922	1.0	24000
10389	9922	1.5	17000
10389	9922	2.0	12000
10389	9922	2.5	11000
10389	9922	3.0	10000
10389	9922	3.5	11000
10389	9922	4.0	12000
10389	9922	4.5	14000
10389	9922	5.0	13000
<u>Borehole B3890R271^d</u>			
10390	9324	0.5	9000
10390	9324	1.0	13000
10390	9324	1.5	14000
10390	9324	2.0	13000

Table C-2
(continued)

Page 51 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R271^d</u> (continued)			
10390	9324	2.5	12000
10390	9324	3.0	13000
10390	9324	3.5	14000
10390	9324	4.0	16000
10390	9324	4.5	16000
10390	9324	5.0	16000
<u>Borehole B3890R229^d</u>			
10390	9334	0.5	11000
10390	9334	1.0	19000
10390	9334	1.5	32000
10390	9334	2.0	41000
10390	9334	2.5	39000
10390	9334	3.0	32000
10390	9334	3.5	22000
10390	9334	4.0	17000
10390	9334	4.5	17000
10390	9334	5.0	20000
10390	9334	5.5	23000
<u>Borehole B3890R230</u>			
10390	9344	0.5	15000
10390	9344	1.0	21000
10390	9344	1.5	18000
10390	9344	2.0	17000
10390	9344	2.5	15000
10390	9344	3.0	14000
10390	9344	3.5	13000
10390	9344	4.0	15000
10390	9344	4.5	17000
10390	9344	5.0	17000
10390	9344	5.5	12000
10390	9344	6.0	12000
10390	9344	6.5	10000
10390	9344	7.0	10000
10390	9344	7.5	9000
10390	9344	8.0	9000
10390	9344	8.5	7000
10390	9344	9.0	7000
10390	9344	9.5	7000

Table C-2
(continued)

Page 52 of 108

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R230 (continued)

10390	9344	10.0	7000
10390	9344	10.5	7000
10390	9344	11.0	7000
10390	9344	11.5	7000
10390	9344	12.0	7000
10390	9344	12.5	6000
10390	9344	13.0	6000
10390	9344	13.5	6000
10390	9344	14.0	7000
10390	9344	14.5	7000
10390	9344	15.0	7000
10390	9344	15.5	9000
10390	9344	16.0	9000
10390	9344	16.5	9000
10390	9344	17.0	9000
10390	9344	17.5	9000
10390	9344	18.0	20000

Borehole B3890R293^d

10397	9334	0.5	12000
10397	9334	1.0	20000
10397	9334	1.5	29000
10397	9334	2.0	24000
10397	9334	2.5	20000
10397	9334	3.0	19000
10397	9334	3.5	20000
10397	9334	4.0	20000

Borehole B3890R717

10400	9400	0.5	11000
10400	9400	1.0	12000
10400	9400	1.5	16000
10400	9400	2.0	18000
10400	9400	2.5	20000
10400	9400	3.0	22000
10400	9400	3.5	22000
10400	9400	4.0	21000
10400	9400	4.5	22000
10400	9400	5.0	27000
10400	9400	5.5	27000

Table C-2
(continued)

Page 53 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R717 (continued)</u>			
10400	9400	6.5	17000
10400	9400	7.0	16000
10400	9400	7.5	18000
10400	9400	8.0	17000
10400	9400	8.5	17000
10400	9400	9.0	16000
10400	9400	9.5	14000
10400	9400	10.0	12000
10400	9400	10.5	12000
10400	9400	11.0	13000
10400	9400	11.5	13000
10400	9400	12.0	12000
10400	9400	12.5	12000
10400	9400	13.0	12000
<u>Borehole B3890R719^d</u>			
10405	9493	0.5	36000
10405	9493	1.0	50000
10405	9493	1.5	34000
10405	9493	2.0	46000
10405	9493	2.5	25000
10405	9493	3.0	21000
10405	9493	3.5	15000
10405	9493	4.0	10000
10405	9493	4.5	10000
10405	9493	5.0	11000
10405	9493	5.5	10000
10405	9493	6.0	12000
10405	9493	6.5	11000
10405	9493	7.0	11000
10405	9493	7.5	11000
<u>Borehole B3890R272^d</u>			
10410	9911	0.5	13000
10410	9911	1.0	11000
10410	9911	1.5	11000
10410	9911	2.0	9000
10410	9911	2.5	9000
10410	9911	3.0	9000
10410	9911	3.5	9000

Table C-2
(continued)

Page 54 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R272^d</u> (continued)			
10410	9911	4.0	9000
10410	9911	4.5	8000
10410	9911	5.0	7000
10410	9911	5.5	6000
10410	9911	6.0	4000
<u>Borehole B3890R231^d</u>			
10411	9781	0.5	17000
10411	9781	1.0	15000
10411	9781	1.5	13000
10411	9781	2.0	12000
10411	9781	2.5	12000
10411	9781	3.0	12000
10411	9781	3.5	12000
10411	9781	4.0	12000
10411	9781	4.5	12000
10411	9781	5.0	12000
10411	9781	5.5	11000
<u>Borehole HA104</u>			
10418	9267	0.5	45000
10418	9267	1.0	46000
10418	9267	1.5	49000
10418	9267	2.0	46000
10418	9267	2.5	50000
<u>Borehole B3890R151^d</u>			
10418	9757	0.5	29000
10418	9757	1.0	27000
10418	9757	1.5	24000
10418	9757	2.0	21000
10418	9757	2.5	15000
10418	9757	3.0	13000
10418	9757	3.5	13000
10418	9757	4.0	13000
10418	9757	4.5	12000
10418	9757	5.0	12000
10418	9757	5.5	12000
10418	9757	6.0	12000

Table C-2
(continued)

Page 55 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R151^d</u> (continued)			
10418	9757	6.5	12000
10418	9757	7.0	12000
10418	9757	7.5	13000
<u>Borehole B3890R149</u>			
10419	9957	0.5	30000
10419	9957	1.0	30000
10419	9957	1.5	26000
10419	9957	2.0	20000
10419	9957	2.5	17000
10419	9957	3.0	19000
<u>Borehole B3890R155^d</u>			
10425	9598	0.5	24000
10425	9598	1.0	24000
10425	9598	1.5	22000
10425	9598	2.0	22000
10425	9598	2.5	18000
10425	9598	3.0	15000
10425	9598	3.5	17000
<u>Borehole HA111</u>			
10436	9225	0.5	24000
10436	9225	1.0	26000
10436	9225	1.5	24000
10436	9225	2.0	31000
10436	9225	2.5	60000
10436	9225	3.0	58000
10436	9225	3.5	21000
<u>Borehole B3890R228</u>			
10438	9264	0.5	15000
10438	9264	1.0	20000
10438	9264	1.5	25000
10438	9264	2.0	28000
10438	9264	2.5	26000
10438	9264	3.0	24000
10438	9264	3.5	22000

Table C-2
(continued)

Page 56 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R228 (continued)

10438	9264	4.5	21000
10438	9264	5.0	21000
10438	9264	5.5	28000
10438	9264	6.0	43000
10438	9264	6.5	43000
10438	9264	7.0	20000
10438	9264	7.5	15000
10438	9264	8.0	11000
10438	9264	8.5	9000
10438	9264	9.0	9000
10438	9264	9.5	8000
10438	9264	10.0	7000

Borehole B3890R291^d

10440	9300	0.5	14000
10440	9300	1.0	21000
10440	9300	1.5	23000
10440	9300	2.0	23000
10440	9300	2.5	22000
10440	9300	3.0	21000
10440	9300	3.5	20000
10440	9300	4.0	19000
10440	9300	4.5	19000
10440	9300	5.0	18000
10440	9300	5.5	17000
10440	9300	6.0	14000
10440	9300	6.5	14000
10440	9300	7.0	15000
10440	9300	7.5	17000
10440	9300	8.0	19000
10440	9300	8.5	22000
10440	9300	9.0	30000
10440	9300	9.5	24000
10440	9300	10.0	15000
10440	9300	10.5	13000
10440	9300	11.0	12000
10440	9300	11.5	12000
10440	9300	12.0	12000
10440	9300	12.5	14000
10440	9300	13.0	14000
10440	9300	13.5	14000

Table C-2
(continued)

Page 57 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R291^d</u> (continued)			
10440	9300	14.0	14000
10440	9300	14.5	14000
10440	9300	15.0	14000
10440	9300	15.5	14000
10440	9300	16.0	14000
10440	9300	16.5	13000
10440	9300	17.0	14000
<u>Borehole B3890R263^d</u>			
10444	9850	0.5	20000
10444	9850	1.0	20000
10444	9850	1.5	17000
10444	9850	2.0	18000
10444	9850	2.5	18000
10444	9850	3.0	19000
10444	9850	3.5	18000
10444	9850	4.0	16000
10444	9850	4.5	14000
10444	9850	5.0	14000
<u>Borehole B3890R226^d</u>			
10446	9260	0.5	8000
10446	9260	1.0	15000
10446	9260	1.5	15000
10446	9260	2.0	16000
10446	9260	2.5	16000
10446	9260	3.0	15000
10446	9260	3.5	14000
10446	9260	4.0	14000
10446	9260	4.5	14000
10446	9260	5.0	15000
10446	9260	5.5	13000
10446	9260	6.0	12000
10446	9260	6.5	11000
10446	9260	7.0	11000
10446	9260	7.5	10000
10446	9260	8.0	9000
10446	9260	8.5	8000
10446	9260	9.0	8000
10446	9260	9.5	8000

Table C-2
(continued)

Page 58 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R226^d</u> (continued)			
10446	9260	10.0	7000
10446	9260	10.5	5000
10446	9260	11.0	5000
10446	9260	11.5	5000
10446	9260	12.0	6000
10446	9260	12.5	7000
10446	9260	13.0	6000
10446	9260	13.5	6000
<u>Borehole B3890R159^d</u>			
10453	9725	0.5	16000
10453	9725	1.0	15000
10453	9725	1.5	14000
10453	9725	2.0	13000
10453	9725	2.5	13000
10453	9725	3.0	13000
10453	9725	3.5	14000
10453	9725	4.0	14000
<u>Borehole B3890R724</u>			
10454	9746	0.5	13000
10454	9746	1.0	14000
10454	9746	1.5	12000
10454	9746	2.0	12000
10454	9746	2.5	12000
10454	9746	3.0	11000
10454	9746	3.5	11000
10454	9746	4.0	12000
10454	9746	4.5	17000
10454	9746	5.0	11000
10454	9746	5.5	11000
10454	9746	6.0	11000
<u>Borehole B3890R723</u>			
10458	9258	0.5	9000
10458	9258	1.0	10000
10458	9258	1.5	14000
10458	9258	2.0	23000
10458	9258	2.5	22000

Table C-2
(continued)

Page 59 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R723 (continued)</u>			
10458	9258	3.0	19000
10458	9258	3.5	21000
10458	9258	4.0	32000
10458	9258	4.5	57000
10458	9258	5.0	58000
10458	9258	5.5	46000
10458	9258	6.0	36000
10458	9258	6.5	29000
10458	9258	7.0	33000
10458	9258	7.5	38000
10458	9258	8.0	49000
10458	9258	8.5	41000
10458	9258	9.0	33000
10458	9258	9.5	21000
10458	9258	10.0	14000
10458	9258	10.5	8000
10458	9258	11.0	8000
10458	9258	11.5	7000
10458	9258	12.0	7000
<u>Borehole B3890C269^d</u>			
10459	9736	0.5	54000
10459	9736	1.0	49000
10459	9736	1.5	26000
10459	9736	2.0	16000
10459	9736	2.5	14000
10459	9736	3.0	14000
10459	9736	3.5	13000
10459	9736	4.0	13000
10459	9736	4.5	14000
10459	9736	5.0	15000
10459	9736	5.5	16000
10459	9736	6.0	14000
10459	9736	6.5	12000
<u>Borehole B3890C266^d</u>			
10464	9732	0.5	180000
10464	9732	1.0	247000
10464	9732	1.5	138000
10464	9732	2.0	196000
10464	9732	2.5	88000

Table C-2
(continued)

Page 60 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890C266^d</u> (continued)			
10464	9732	3.0	34000
10464	9732	3.5	23000
10464	9732	4.0	20000
10464	9732	4.5	19000
10464	9732	5.0	17000
10464	9732	5.5	15000
10464	9732	6.0	15000
10464	9732	6.5	15000
10464	9732	7.0	14000
10464	9732	7.5	14000
10464	9732	8.0	15000
10464	9732	8.5	17000
10464	9732	9.0	16000
10464	9732	9.5	16000
<u>Borehole B3890R223</u>			
10485	9567	0.5	5000
10485	9567	1.0	7000
10485	9567	1.5	10000
10485	9567	2.0	11000
10485	9567	2.5	10000
10485	9567	3.0	10000
10485	9567	3.5	9000
10485	9567	4.0	9000
10485	9567	4.5	8000
10485	9567	5.0	8000
10485	9567	5.5	8000
<u>Borehole HA110</u>			
10486	9224	0.5	20000
10486	9224	1.0	13000
10486	9224	1.5	12000
10486	9224	2.0	11000
10486	9224	2.5	8000
10486	9224	3.0	6000
10486	9224	3.5	6000

Table C-2
(continued)

Page 61 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R725</u>			
10488	9716	0.5	26000
10488	9716	1.0	29000
10488	9716	1.5	29000
10488	9716	2.0	20000
10488	9716	2.5	13000
10488	9716	3.0	11000
10488	9716	3.5	11000
10488	9716	4.0	11000
10488	9716	4.5	11000
10488	9716	5.0	11000
10488	9716	5.5	10000
10488	9716	6.0	12000
10488	9716	6.5	12000
10488	9716	7.0	12000
10488	9716	7.5	13000
10488	9716	8.0	16000
10488	9716	8.5	16000
10488	9716	9.0	13000
<u>Borehole B3890R142^d</u>			
10500	9850	0.5	19000
10500	9850	1.0	18000
10500	9850	1.5	16000
10500	9850	2.0	15000
10500	9850	2.5	15000
10500	9850	3.0	14000
10500	9850	3.5	14000
<u>Borehole B3890R132^d</u>			
10515	9959	0.5	11000
10515	9959	1.0	12000
10515	9959	1.5	13000
10515	9959	2.0	14000
10515	9959	2.5	14000
10515	9959	3.0	15000
10515	9959	3.5	16000
10515	9959	4.0	16000
10515	9959	4.5	16000
10515	9959	5.0	15000
10515	9959	5.5	15000
10515	9959	6.0	15000
10515	9959	6.5	18000

Table C-2
(continued)

Page 62 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R131^d</u>			
10515	10000	0.5	11000
10515	10000	1.0	13000
10515	10000	1.5	15000
10515	10000	2.0	18000
10515	10000	2.5	21000
10515	10000	3.0	22000
10515	10000	3.5	18000
10515	10000	4.0	20000
10515	10000	4.5	18000
10515	10000	5.0	17000
10515	10000	5.5	17000
10515	10000	6.0	16000
10515	10000	6.5	15000
10515	10000	7.0	14000
10515	10000	7.5	14000
10515	10000	8.0	15000
<u>Borehole B3890R726</u>			
10520	9755	0.5	27000
10520	9755	1.0	26000
10520	9755	1.5	24000
10520	9755	2.0	21000
10520	9755	2.5	14000
10520	9755	3.0	12000
10520	9755	3.5	12000
10520	9755	4.0	11000
10520	9755	4.5	10000
10520	9755	5.0	10000
10520	9755	5.5	9000
10520	9755	6.0	8000
<u>Borehole B3890R124^d</u>			
10525	10000	0.5	19000
10525	10000	1.0	28000
10525	10000	1.5	43000
10525	10000	2.0	68000
10525	10000	2.5	176000
10525	10000	3.0	358000
10525	10000	3.5	468000
10525	10000	4.0	455000

Table C-2
(continued)

Page 63 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R124^d (continued)

10525	10000	4.5	396000
10525	10000	5.0	275000
10525	10000	5.5	220000
10525	10000	6.0	183000

Borehole HA109

10536	9223	0.5	28000
10536	9223	1.0	16000
10536	9223	1.5	5000
10536	9223	2.0	3000
10536	9223	2.5	3000
10536	9223	3.0	5000
10536	9223	3.5	6000

Borehole B3890R133^d

10550	9950	0.5	12000
10550	9950	1.0	13000
10550	9950	1.5	13000
10550	9950	2.0	13000
10550	9950	2.5	14000
10550	9950	3.0	14000
10550	9950	3.5	14000
10550	9950	4.0	14000
10550	9950	4.5	14000
10550	9950	5.0	14000
10550	9950	5.5	15000
10550	9950	6.0	15000
10550	9950	6.5	16000
10550	9950	7.0	16000
10550	9950	7.5	18000
10550	9950	8.0	18000
10550	9950	8.5	19000
10550	9950	9.0	18000
10550	9950	9.5	17000
10550	9950	10.0	18000
10550	9950	10.5	19000

Table C-2
(continued)

Page 64 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890C298^d</u>			
10550	9957	0.5	38000
10550	9957	1.0	27000
10550	9957	1.5	26000
10550	9957	2.0	34000
10550	9957	2.5	72000
10550	9957	3.0	96000
10550	9957	3.5	113000
10550	9957	4.0	164000
10550	9957	4.5	347000
10550	9957	5.0	561000
10550	9957	5.5	660000
10550	9957	6.0	657000
10550	9957	6.5	659000
10550	9957	7.0	655000
10550	9957	7.5	616000
10550	9957	8.0	538000
10550	9957	8.5	545000
10550	9957	9.0	545000
10550	9957	9.5	556000
10550	9957	10.0	513000
10550	9957	10.5	502000
10550	9957	11.0	310000
10550	9957	11.5	106000
10550	9957	12.0	89000
10550	9957	12.5	50000
10550	9957	13.0	38000
10550	9957	13.5	36000
10550	9957	14.0	15000
10550	9957	14.5	15000
10550	9957	15.0	14000
10550	9957	15.5	14000
<u>Borehole B3890R134^d</u>			
10550	9960	0.5	21000
10550	9960	1.0	25000
10550	9960	1.5	37000
10550	9960	2.0	74000
10550	9960	2.5	112000
10550	9960	3.0	101000
10550	9960	3.5	155000
10550	9960	4.0	290000

Table C-2
(continued)

Page 65 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R134^d</u> (continued)			
10550	9960	5.0	422000
10550	9960	5.5	531000
10550	9960	6.0	551000
10550	9960	6.5	524000
10550	9960	7.0	538000
10550	9960	7.5	515000
10550	9960	8.0	485000
10550	9960	8.5	438000
10550	9960	9.0	418000
10550	9960	9.5	411000
10550	9960	10.0	396000
10550	9960	10.5	364000
10550	9960	11.0	326000
10550	9960	11.5	266000
<u>Borehole B3890R125^d</u>			
10550	10000	0.5	12000
10550	10000	1.0	16000
10550	10000	1.5	23000
10550	10000	2.0	40000
10550	10000	2.5	68000
10550	10000	3.0	93000
10550	10000	3.5	82000
10550	10000	4.0	117000
10550	10000	4.5	169000
10550	10000	5.0	131000
10550	10000	5.5	72000
10550	10000	6.0	43000
10550	10000	6.5	33000
10550	10000	7.0	28000
10550	10000	7.5	23000
10550	10000	8.0	22000
10550	10000	8.5	23000
10550	10000	9.0	26000
10550	10000	9.5	30000
10550	10000	10.0	35000
10550	10000	10.5	37000
10550	10000	11.0	39000
10550	10000	11.5	40000
10550	10000	12.0	43000

Table C-2
(continued)

Page 66 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R287^d</u>			
10560	9550	0.5	12000
10560	9550	1.0	15000
10560	9550	1.5	13000
10560	9550	2.0	11000
10560	9550	2.5	11000
10560	9550	3.0	11000
10560	9550	3.5	11000
10560	9550	4.0	10000
10560	9550	4.5	9000
10560	9550	5.0	8000
10560	9550	5.5	8000
<u>Borehole HA108</u>			
10586	9222	0.5	7000
10586	9222	1.0	10000
10586	9222	1.5	10000
10586	9222	2.0	6000
10586	9222	2.5	6000
10586	9222	3.0	6000
10586	9222	3.5	6000
<u>Borehole B3890R140^d</u>			
10600	9222	0.5	13000
10600	9222	1.0	14000
10600	9222	1.5	14000
10600	9222	2.0	15000
10600	9222	2.5	14000
10600	9222	3.0	14000
10600	9222	3.5	13000
10600	9222	4.0	13000
10600	9222	4.5	13000
10600	9222	5.0	14000
10600	9222	5.5	12000
<u>Borehole B3890R126^d</u>			
10600	10000	0.5	43000
10600	10000	1.0	51000
10600	10000	1.5	72000
10600	10000	2.0	85000
10600	10000	2.5	115000

Table C-2
(continued)

Page 67 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R126^d</u> (continued)			
10600	10000	3.0	278000
10600	10000	3.5	452000
10600	10000	4.0	505000
10600	10000	4.5	471000
10600	10000	5.0	576000
10600	10000	5.5	614000
10600	10000	6.0	618000
10600	10000	6.5	616000
10600	10000	7.0	619000
10600	10000	7.5	632000
10600	10000	8.0	626000
10600	10000	8.5	627000
10600	10000	9.0	625000
10600	10000	9.5	635000
10600	10000	10.0	676000
<u>Borehole B3890R286</u>			
10605	9640	0.5	8000
10605	9640	1.0	11000
10605	9640	1.5	12000
10605	9640	2.0	13000
10605	9640	2.5	13000
10605	9640	3.0	14000
10605	9640	3.5	14000
10605	9640	4.0	14000
<u>Borehole B3890R135^d</u>			
10620	10019	0.5	38000
10620	10019	1.0	62000
10620	10019	1.5	146000
10620	10019	2.0	316000
10620	10019	2.5	422000
10620	10019	3.0	436000
10620	10019	3.5	414000
10620	10019	4.0	268000
10620	10019	4.5	125000
10620	10019	5.0	66000
10620	10019	5.5	45000
10620	10019	6.0	31000
10620	10019	6.5	37000

Table C-2
(continued)

Page 68 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R137^d</u>			
10628	9956	0.5	23000
10628	9956	1.0	22000
10628	9956	1.5	16000
10628	9956	2.0	14000
10628	9956	2.5	14000
10628	9956	3.0	14000
10628	9956	3.5	14000
10628	9956	4.0	14000
10628	9956	4.5	13000
10628	9956	5.0	13000
10628	9956	5.5	14000
<u>Borehole B3890R136^d</u>			
10630	10024	0.5	22000
10630	10024	1.0	28000
10630	10024	1.5	16000
10630	10024	2.0	13000
10630	10024	2.5	12000
10630	10024	3.0	13000
10630	10024	3.5	13000
10630	10024	4.0	13000
10630	10024	4.5	13000
10630	10024	5.0	14000
10630	10024	5.5	14000
<u>Borehole B3890R192</u>			
10644	9350	0.5	10000
10644	9350	1.0	12000
10644	9350	1.5	8000
10644	9350	2.0	7000
10644	9350	2.5	7000
10644	9350	3.0	9000
10644	9350	3.5	11000
10644	9350	4.0	12000
10644	9350	4.5	12000
10644	9350	5.0	13000
10644	9350	5.5	13000
10644	9350	6.0	13000
10644	9350	6.5	13000
10644	9350	7.0	11000

Table C-2
(continued)

Page 69 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R192 (continued)</u>			
10644	9350	8.0	12000
10644	9350	8.5	11000
10644	9350	9.0	11000
10644	9350	9.5	12000
10644	9350	10.0	12000
<u>Borehole B3890R274</u>			
10650	9440	2.0	6000
10650	9440	2.5	9000
10650	9440	3.0	13000
10650	9440	3.5	13000
10650	9440	4.0	12000
10650	9440	4.5	11000
10650	9440	5.0	12000
10650	9440	5.5	12000
10650	9440	6.0	12000
10650	9440	6.5	12000
10650	9440	7.0	11000
10650	9440	7.5	12000
10650	9440	8.0	11000
<u>Borehole B3890R273</u>			
10650	9450	0.5	7000
10650	9450	1.0	10000
10650	9450	1.5	11000
10650	9450	2.0	11000
10650	9450	2.5	11000
<u>Borehole B3890R127^d</u>			
10650	10000	0.5	8000
10650	10000	1.0	9000
10650	10000	1.5	10000
10650	10000	2.0	10000
10650	10000	2.5	10000
10650	10000	3.0	11000
10650	10000	3.5	11000
10650	10000	4.0	9000

Table C-2
(continued)

Page 70 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R215^d</u>			
10655	9774	0.5	24000
10655	9774	1.0	25000
10655	9774	1.5	18000
10655	9774	2.0	14000
10655	9774	2.5	13000
10655	9774	3.0	12000
10655	9774	3.5	12000
10655	9774	4.0	13000
10655	9774	4.5	13000
10655	9774	5.0	13000
10655	9774	5.5	12000
10655	9774	6.0	13000
10655	9774	6.5	14000
10655	9774	7.0	14000
10655	9774	7.5	13000
<u>Borehole B3890R156^d</u>			
10656	9686	0.5	11000
10656	9686	1.0	12000
10656	9686	1.5	13000
10656	9686	2.0	12000
10656	9686	2.5	12000
10656	9686	3.0	12000
10656	9686	3.5	12000
10656	9686	4.0	12000
10656	9686	4.5	11000
<u>Borehole B3890R217^d</u>			
10656	9691	0.5	14000
10656	9691	1.0	14000
10656	9691	1.5	13000
10656	9691	2.0	12000
10656	9691	2.5	11000
10656	9691	3.0	11000
10656	9691	3.5	12000
10656	9691	4.0	11000
10656	9691	4.5	11000
10656	9691	5.0	12000
10656	9691	5.5	12000

Table C-2
(continued)

Page 71 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R217^d</u> (continued)			
10656	9691	6.0	13000
10656	9691	6.5	14000
10656	9691	7.0	14000
<u>Borehole B3890R165^d</u>			
10657	9720	0.5	29000
10657	9720	1.0	18000
10657	9720	1.5	15000
10657	9720	2.0	12000
10657	9720	2.5	12000
10657	9720	3.0	12000
10657	9720	3.5	13000
10657	9720	4.0	13000
10657	9720	4.5	12000
10657	9720	5.0	13000
10657	9720	5.5	13000
10657	9720	6.0	13000
10657	9720	6.5	13000
10657	9720	7.0	14000
10657	9720	7.5	14000
10657	9720	8.0	13000
10657	9720	8.5	13000
10657	9720	9.0	13000
<u>Borehole B3890R130^d</u>			
10660	10000	0.5	31000
10660	10000	1.0	61000
10660	10000	1.5	64000
10660	10000	2.0	34000
10660	10000	2.5	19000
10660	10000	3.0	15000
10660	10000	3.5	16000
10660	10000	4.0	17000
<u>Borehole B3890R216^d</u>			
10673	9781	0.5	22000
10673	9781	1.0	13000
10673	9781	1.5	12000
10673	9781	2.0	11000

Table C-2
(continued)

Page 72 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R216^d</u> (continued)			
10673	9781	2.5	11000
10673	9781	3.0	11000
10673	9781	3.5	11000
10673	9781	4.0	12000
10673	9781	4.5	12000
10673	9781	5.0	12000
10673	9781	5.5	12000
10673	9781	6.0	11000
<u>Borehole B3890R129^d</u>			
10675	10000	0.5	11000
10675	10000	1.0	11000
10675	10000	1.5	10000
10675	10000	2.0	11000
10675	10000	2.5	11000
10675	10000	3.0	11000
10675	10000	3.5	11000
10675	10000	4.0	11000
10675	10000	4.5	11000
10675	10000	5.0	10000
<u>Borehole B3890R162^d</u>			
10677	9685	0.5	82000
10677	9685	1.0	82000
10677	9685	1.5	93000
10677	9685	2.0	104000
10677	9685	2.5	169000
10677	9685	3.0	270000
10677	9685	3.5	348000
10677	9685	4.0	373000
10677	9685	4.5	369000
10677	9685	5.0	363000
10677	9685	5.5	333000
10677	9685	6.0	390000
10677	9685	6.5	314000
10677	9685	7.0	380000
10677	9685	7.5	400000
10677	9685	8.0	402000
10677	9685	8.5	417000

Table C-2
(continued)

Page 73 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R162^d</u> (continued)			
10677	9685	9.0	417000
10677	9685	9.5	445000
10677	9685	10.0	438000
10677	9685	10.5	430000
10677	9685	11.0	429000
10677	9685	11.5	454000
10677	9685	12.0	137000
10677	9685	12.5	434000
10677	9685	13.0	407000
<u>Borehole B3890R167^d</u>			
10678	9770	0.5	23000
10678	9770	1.0	38000
10678	9770	1.5	87000
10678	9770	2.0	101000
10678	9770	2.5	89000
10678	9770	3.0	115000
10678	9770	3.5	187000
10678	9770	4.0	310000
10678	9770	4.5	413000
10678	9770	5.0	828000
10678	9770	5.5	1024000
10678	9770	6.0	1113000
10678	9770	6.5	1028000
10678	9770	7.0	1093000
10678	9770	7.5	1107000
10678	9770	8.0	1077000
10678	9770	8.5	1034000
10678	9770	9.0	1005000
10678	9770	9.5	1011000
10678	9770	10.0	999000
10678	9770	10.5	1009000
10678	9770	11.0	1041000
10678	9770	11.5	904000
10678	9770	12.0	434000
10678	9770	12.5	347000
10678	9770	13.0	283000
10678	9770	13.5	137000

Table C-2
(continued)

Page 74 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R166</u>			
10680	9721	0.5	39000
10680	9721	1.0	112000
10680	9721	1.5	130000
10680	9721	2.0	137000
10680	9721	2.5	137000
10680	9721	3.0	151000
10680	9721	3.5	195000
10680	9721	4.0	296000
10680	9721	4.5	383000
10680	9721	5.0	440000
10680	9721	5.5	443000
10680	9721	6.0	440000
10680	9721	6.5	427000
10680	9721	7.0	430000
10680	9721	7.5	460000
10680	9721	8.0	535000
10680	9721	8.5	532000
10680	9721	9.0	449000
10680	9721	9.5	448000
10680	9721	10.0	497000
10680	9721	10.5	462000
10680	9721	11.0	434000
10680	9721	11.5	447000
10680	9721	12.0	593000
10680	9721	12.5	606000
10680	9721	13.0	507000
<u>Borehole B3890R214</u>			
10684	9663	0.5	8000
10684	9663	1.0	11000
10684	9663	1.5	14000
10684	9663	2.0	15000
10684	9663	2.5	15000
10684	9663	3.0	14000
10684	9663	3.5	13000
10684	9663	4.0	12000

Table C-2
(continued)

Page 75 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R171^d</u>			
10688	9245	0.5	6000
10688	9245	1.0	8000
10688	9245	1.5	14000
10688	9245	2.0	26000
10688	9245	2.5	36000
10688	9245	3.0	34000
10688	9245	3.5	30000
10688	9245	4.0	22000
10688	9245	4.5	17000
10688	9245	5.0	13000
10688	9245	5.5	13000
10688	9245	6.0	12000
10688	9245	6.5	13000
10688	9245	7.0	13000
10688	9245	7.5	13000
10688	9245	8.0	13000
10688	9245	8.5	13000
10688	9245	9.0	13000
10688	9245	9.5	12000
10688	9245	10.0	12000
10688	9245	10.5	12000
10688	9245	11.0	12000
10688	9245	11.5	12000
10688	9245	12.0	12000
10688	9245	12.5	12000
10688	9245	13.0	12000
10688	9245	13.5	13000
<u>Borehole B3890R218</u>			
10698	9686	0.5	70000
10698	9686	1.0	92000
10698	9686	1.5	119000
10698	9686	2.0	162000
10698	9686	2.5	168000
10698	9686	3.0	399000
10698	9686	3.5	358000
10698	9686	4.0	359000
10698	9686	4.5	358000
10698	9686	5.0	403000

Table C-2
(continued)

Page 76 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R218 (continued)</u>			
10698	9686	5.5	426000
10698	9686	6.0	416000
10698	9686	6.5	401000
10698	9686	7.0	398000
10698	9686	7.5	407000
10698	9686	8.0	424000
10698	9686	8.5	446000
10698	9686	9.0	495000
10698	9686	9.5	599000
10698	9686	10.0	702000
10698	9686	10.5	838000
10698	9686	11.0	905000
10698	9686	11.5	591000
10698	9686	12.0	460000
10698	9686	12.5	440000
10698	9686	13.0	371000
<u>Borehole B3890R276^d</u>			
10700	9500	0.5	7000
10700	9500	1.0	5000
10700	9500	1.5	6000
10700	9500	2.0	8000
10700	9500	2.5	10000
10700	9500	3.0	11000
10700	9500	3.5	11000
10700	9500	4.0	12000
10700	9500	4.5	12000
10700	9500	5.0	11000
10700	9500	5.5	11000
10700	9500	6.0	11000
10700	9500	6.5	11000
10700	9500	7.0	11000
<u>Borehole B3890R161^d</u>			
10700	9686	0.5	17000
10700	9686	1.0	21000
10700	9686	1.5	29000
10700	9686	2.0	42000
10700	9686	2.5	69000

Table C-2
(continued)

Page 77 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R161^d</u> (continued)			
10700	9686	3.0	171000
10700	9686	3.5	333000
10700	9686	4.0	313000
<u>Borehole B3890R141^d</u>			
10700	9850	0.5	7000
10700	9850	1.0	10000
10700	9850	1.5	11000
10700	9850	2.0	13000
10700	9850	2.5	13000
10700	9850	3.0	14000
10700	9850	3.5	14000
10700	9850	4.0	15000
10700	9850	4.5	14000
10700	9850	5.0	12000
<u>Borehole B3890R128^d</u>			
10700	10000	0.5	9000
10700	10000	1.0	11000
10700	10000	1.5	10000
10700	10000	2.0	11000
10700	10000	2.5	11000
10700	10000	3.0	11000
10700	10000	3.5	11000
10700	10000	4.0	9000
<u>Borehole B3890R205^d</u>			
10710	9238	0.5	7000
10710	9238	1.0	13000
10710	9238	1.5	25000
10710	9238	2.0	39000
10710	9238	2.5	37000
10710	9238	3.0	30000
<u>Borehole B3891C296^d</u>			
10745	10003	0.5	9000
10745	10003	1.0	9000

Table C-2
(continued)

Page 78 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3891C296^d (continued)</u>			
10745	10003	2.0	14000
10745	10003	2.5	15000
10745	10003	3.0	16000
10745	10003	3.5	14000
10745	10003	4.0	13000
10745	10003	4.5	12000
10745	10003	5.0	12000
10745	10003	5.5	12000
10745	10003	6.0	11000
10745	10003	6.5	11000
10745	10003	7.0	12000
10745	10003	7.5	13000
10745	10003	8.0	12000
10745	10003	8.5	13000
10745	10003	9.0	14000
10745	10003	9.5	14000
<u>Borehole B3890R138^d</u>			
10746	10000	0.5	10000
10746	10000	1.0	10000
10746	10000	1.5	9000
10746	10000	2.0	10000
10746	10000	2.5	12000
10746	10000	3.0	13000
10746	10000	3.5	13000
10746	10000	4.0	14000
10746	10000	4.5	13000
10746	10000	5.0	13000
10746	10000	5.5	12000
10746	10000	6.0	12000
10746	10000	6.5	12000
10746	10000	7.0	12000
10746	10000	7.5	12000
<u>Borehole B3890R254^d</u>			
10748	9686	10.0	278000
10748	9686	10.5	279000
10748	9686	11.0	173000
10748	9686	11.5	79000

Table C-2
(continued)

Page 79 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R254^d</u> (continued)			
10748	9686	12.0	46000
10748	9686	12.5	17000
10748	9686	13.0	11000
10748	9686	13.5	9000
10748	9686	14.0	6000
10748	9686	14.5	7000
<u>Borehole B3890R213^d</u>			
10750	9665	0.5	7000
10750	9665	1.0	9000
10750	9665	1.5	10000
10750	9665	2.0	11000
10750	9665	2.5	12000
10750	9665	3.0	12000
10750	9665	3.5	12000
10750	9665	4.0	12000
10750	9665	4.5	12000
10750	9665	5.0	13000
<u>Borehole B3890R160^d</u>			
10750	9686	0.5	39000
10750	9686	1.0	54000
10750	9686	1.5	111000
10750	9686	2.0	153000
10750	9686	2.5	172000
10750	9686	3.0	238000
10750	9686	3.5	283000
10750	9686	4.0	361000
10750	9686	4.5	435000
10750	9686	5.0	563000
10750	9686	5.5	561000
10750	9686	6.0	538000
10750	9686	6.5	525000
10750	9686	7.0	640000
10750	9686	7.5	506000
10750	9686	8.0	1105000
10750	9686	8.5	1035000
10750	9686	9.0	1016000
10750	9686	9.5	1022000

Table C-2
(continued)

Page 80 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R170^d</u>			
10750	9786	0.5	39000
10750	9786	1.0	47000
10750	9786	1.5	47000
10750	9786	2.0	48000
10750	9786	2.5	47000
10750	9786	3.0	40000
<u>Borehole B3890R139^d</u>			
10750	9950	0.5	11000
10750	9950	1.0	11000
10750	9950	1.5	17000
10750	9950	2.0	12000
10750	9950	2.5	12000
10750	9950	3.0	12000
10750	9950	3.5	12000
10750	9950	4.0	12000
10750	9950	4.5	12000
10750	9950	5.0	12000
10750	9950	5.5	12000
10750	9950	6.0	11000
10750	9950	6.5	12000
10750	9950	7.0	12000
<u>Borehole B3890R204^d</u>			
10755	9237	0.5	8000
10755	9237	1.0	12000
10755	9237	1.5	20000
10755	9237	2.0	32000
10755	9237	2.5	42000
10755	9237	3.0	39000
10755	9237	3.5	31000
10755	9237	4.0	21000
10755	9237	4.5	14000
10755	9237	5.0	13000
10755	9237	5.5	12000

Table C-2
(continued)

Page 81 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R219^d</u>			
10756	9791	0.5	14000
10756	9791	1.0	17000
10756	9791	1.5	16000
10756	9791	2.0	12000
10756	9791	2.5	10000
10756	9791	3.0	9000
10756	9791	3.5	8000
10756	9791	4.0	8000
10756	9791	4.5	10000
10756	9791	5.0	10000
10756	9791	5.5	6000
<u>Borehole B3890R277</u>			
10798	9498	0.5	5000
10798	9498	1.0	5000
10798	9498	1.5	6000
10798	9498	2.0	7000
10798	9498	2.5	10000
10798	9498	3.0	10000
10798	9498	3.5	9000
10798	9498	4.0	10000
10798	9498	4.5	10000
10798	9498	5.0	9000
10798	9498	5.5	9000
10798	9498	6.0	10000
10798	9498	6.5	8000
10798	9498	7.0	8000
10798	9498	7.5	7000
10798	9498	8.0	6000
10798	9498	8.5	6000
10798	9498	9.0	7000
10798	9498	9.5	7000
10798	9498	10.0	6000
10798	9498	10.5	7000
10798	9498	11.0	8000
10798	9498	11.5	11000

Table C-2
(continued)

Page 82 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole HA098</u>			
10800	9220	0.5	11000
10800	9220	1.0	19000
10800	9220	1.5	8000
10800	9220	2.0	8000
10800	9220	2.5	8000
10800	9220	3.0	8000
<u>Borehole B3890R211^d</u>			
10800	9665	0.5	11000
10800	9665	1.0	11000
10800	9665	1.5	12000
10800	9665	2.0	12000
10800	9665	2.5	11000
10800	9665	3.0	12000
10800	9665	3.5	13000
10800	9665	4.0	14000
10800	9665	4.5	15000
10800	9665	5.0	16000
10800	9665	5.5	17000
10800	9665	6.0	16000
10800	9665	6.5	15000
10800	9665	7.0	14000
<u>Borehole B3890R163</u>			
10800	9685	0.5	40000
10800	9685	1.0	35000
10800	9685	1.5	30000
10800	9685	2.0	29000
10800	9685	2.5	31000
10800	9685	3.0	35000
10800	9685	3.5	43000
10800	9685	4.0	50000
10800	9685	4.5	60000
10800	9685	5.0	76000
10800	9685	5.5	110000
10800	9685	6.0	54000
10800	9685	6.5	74000

Table C-2
(continued)

Page 83 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R202^d</u>			
10817	9240	0.5	8000
10817	9240	1.0	13000
10817	9240	1.5	19000
10817	9240	2.0	22000
10817	9240	2.5	17000
10817	9240	3.0	13000
10817	9240	3.5	11000
10817	9240	4.0	11000
10817	9240	4.5	11000
10817	9240	5.0	10000
10817	9240	5.5	10000
10817	9240	6.0	10000
10817	9240	6.5	11000
10817	9240	7.0	12000
10817	9240	7.5	13000
10817	9240	8.0	13000
10817	9240	8.5	12000
10817	9240	9.0	13000
<u>Borehole B3890C255</u>			
10822	9724	14.5	239000
10822	9724	15.0	234000
10822	9724	15.5	65000
10822	9724	16.0	19000
10822	9724	16.5	15000
10822	9724	17.0	12000
10822	9724	17.5	19000
10822	9724	18.0	18000
10822	9724	18.5	18000
10822	9724	19.0	20000
10822	9724	19.5	22000
10822	9724	20.0	22000
<u>Borehole B3890R154</u>			
10823	9782	0.5	65000
10823	9782	1.0	92000
10823	9782	1.5	102000
10823	9782	2.0	141000
10823	9782	2.5	241000

Table C-2
(continued)

Page 84 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R154 (continued)

10823	9782	3.0	348000
10823	9782	3.5	416000
10823	9782	4.0	409000
10823	9782	4.5	381000
10823	9782	5.0	357000
10823	9782	5.5	331000
10823	9782	6.0	313000
10823	9782	6.5	221000
10823	9782	7.0	89000
10823	9782	7.5	41000
10823	9782	8.0	27000
10823	9782	8.5	20000
10823	9782	9.0	17000
10823	9782	9.5	15000
10823	9782	10.0	13000
10823	9782	10.5	13000
10823	9782	11.0	13000
10823	9782	11.5	13000
10823	9782	12.0	16000
10823	9782	12.5	27000
10823	9782	13.0	21000
10823	9782	13.5	17000
10823	9782	14.0	21000

Borehole B3890R220^d

10823	9793	0.5	22000
10823	9793	1.0	22000
10823	9793	1.5	17000
10823	9793	2.0	15000
10823	9793	2.5	13000
10823	9793	3.0	11000
10823	9793	3.5	9000
10823	9793	4.0	7000
10823	9793	4.5	7000
10823	9793	5.0	7000
10823	9793	5.5	7000
10823	9793	6.0	7000
10823	9793	6.5	8000
10823	9793	7.0	8000
10823	9793	7.5	6000

Table C-2
(continued)

Page 85 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R143^d</u>			
10825	9724	0.5	32000
10825	9724	1.0	55000
10825	9724	1.5	227000
10825	9724	2.0	243000
10825	9724	2.5	224000
10825	9724	3.0	244000
10825	9724	3.5	306000
10825	9724	4.0	400000
10825	9724	4.5	457000
10825	9724	5.0	578000
10825	9724	5.5	661000
10825	9724	6.0	761000
10825	9724	6.5	819000
10825	9724	7.0	778000
10825	9724	7.5	844000
10825	9724	8.0	988000
10825	9724	8.5	1073000
10825	9724	9.0	1094000
10825	9724	9.5	1072000
10825	9724	10.0	1048000
10825	9724	10.5	1069000
10825	9724	11.0	1113000
10825	9724	11.5	1027000
10825	9724	12.0	848000
10825	9724	12.5	815000
10825	9724	13.0	708000
10825	9724	13.5	644000
10825	9724	14.0	587000
10825	9724	14.5	622000
10825	9724	15.0	724000
10825	9724	15.5	731000
<u>Borehole B3890R172^d</u>			
10828	9250	0.5	10000
10828	9250	1.0	35000
10828	9250	1.5	46000
10828	9250	2.0	25000
10828	9250	2.5	16000
10828	9250	3.0	12000
10828	9250	3.5	12000

Table C-2
(continued)

Page 86 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R172^d (continued)

10828	9250	4.0	11000
10828	9250	4.5	12000
10828	9250	5.0	12000
10828	9250	5.5	12000
10828	9250	6.0	12000
10828	9250	6.5	12000
10828	9250	7.0	13000
10828	9250	7.5	14000
10828	9250	8.0	14000
10828	9250	8.5	14000
10828	9250	9.0	13000
10828	9250	9.5	12000
10828	9250	10.0	12000
10828	9250	10.5	12000
10828	9250	11.0	13000
10828	9250	11.5	13000
10828	9250	12.0	13000
10828	9250	12.5	12000
10828	9250	13.0	10000

Borehole B3890R175^d

10830	9300	0.5	6000
10830	9300	1.0	7000
10830	9300	1.5	11000
10830	9300	2.0	12000
10830	9300	2.5	10000
10830	9300	3.0	9000
10830	9300	3.5	10000
10830	9300	4.0	8000
10830	9300	4.5	8000
10830	9300	5.0	9000
10830	9300	5.5	11000
10830	9300	6.0	10000
10830	9300	6.5	10000
10830	9300	7.0	9000
10830	9300	7.5	9000
10830	9300	8.0	9000
10830	9300	8.5	10000
10830	9300	9.0	12000

Table C-2
(continued)

Page 87 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R175^d</u> (continued)			
10830	9300	9.5	12000
10830	9300	10.0	13000
10830	9300	10.5	16000
10830	9300	11.0	20000
<u>Borehole B3890R176^d</u>			
10831	9350	0.5	3000
10831	9350	1.0	13000
10831	9350	1.5	18000
10831	9350	2.0	18000
10831	9350	2.5	14000
10831	9350	3.0	11000
10831	9350	3.5	10000
10831	9350	4.0	10000
10831	9350	4.5	11000
10831	9350	5.0	11000
10831	9350	5.5	10000
10831	9350	6.0	10000
10831	9350	6.5	11000
10831	9350	7.0	10000
10831	9350	7.5	9000
10831	9350	8.0	9000
10831	9350	8.5	9000
10831	9350	9.0	10000
10831	9350	9.5	10000
10831	9350	10.0	11000
10831	9350	10.5	12000
10831	9350	11.0	12000
10831	9350	11.5	12000
<u>Borehole B3890R178^d</u>			
10832	9400	0.5	6000
10832	9400	1.0	11000
10832	9400	1.5	14000
10832	9400	2.0	12000
10832	9400	2.5	11000
10832	9400	3.0	10000
10832	9400	3.5	10000
10832	9400	4.0	11000
10832	9400	4.5	11000

Table C-2
(continued)

Page 88 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R178^d</u> (continued)			
10832	9400	5.0	10000
10832	9400	5.5	11000
10832	9400	6.0	11000
10832	9400	6.5	11000
10832	9400	7.0	12000
10832	9400	7.5	12000
10832	9400	8.0	11000
10832	9400	8.5	11000
10832	9400	9.0	11000
<u>Borehole HA100</u>			
10850	9218	0.5	10000
10850	9218	1.0	10000
10850	9218	1.5	6000
10850	9218	2.0	6000
10850	9218	2.5	6000
10850	9218	3.0	7000
<u>Borehole B3890R191</u>			
10850	9446	0.5	7000
10850	9446	1.0	11000
10850	9446	1.5	17000
10850	9446	2.0	17000
10850	9446	2.5	17000
10850	9446	3.0	16000
10850	9446	3.5	16000
10850	9446	4.0	16000
10850	9446	4.5	15000
10850	9446	5.0	15000
10850	9446	5.5	14000
10850	9446	6.0	13000
10850	9446	6.5	14000
10850	9446	7.0	13000
10850	9446	7.5	11000
10850	9446	8.0	10000
10850	9446	8.5	10000
10850	9446	9.0	10000
10850	9446	9.5	10000
10850	9446	10.0	9000

Table C-2
(continued)

Page 89 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R191 (continued)

10850	9446	10.5	9000
10850	9446	11.0	9000
10850	9446	11.5	9000
10850	9446	12.0	11000
10850	9446	12.5	12000
10850	9446	13.0	14000
10850	9446	13.5	14000

Borehole B3890R164^d

10850	9683	0.5	18000
10850	9683	1.0	21000
10850	9683	1.5	22000
10850	9683	2.0	23000
10850	9683	2.5	22000
10850	9683	3.0	18000
10850	9683	3.5	16000
10850	9683	4.0	14000
10850	9683	4.5	14000
10850	9683	5.0	13000
10850	9683	5.5	13000
10850	9683	6.0	12000
10850	9683	6.5	12000
10850	9683	7.0	13000
10850	9683	7.5	13000
10850	9683	8.0	13000
10850	9683	8.5	13000
10850	9683	9.0	14000
10850	9683	9.5	13000
10850	9683	10.0	13000

Borehole B3890R145^d

10862	9725	0.5	232000
10862	9725	1.0	240000
10862	9725	1.5	301000
10862	9725	2.0	412000
10862	9725	2.5	412000
10862	9725	3.0	438000
10862	9725	3.5	476000
10862	9725	4.0	513000
10862	9725	4.5	512000

Table C-2
(continued)

Page 90 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R145^d</u> (continued)			
10862	9725	5.0	547000
10862	9725	5.5	585000
10862	9725	6.0	566000
10862	9725	6.5	561000
10862	9725	7.0	692000
10862	9725	7.5	1138000
10862	9725	8.0	1188000
10862	9725	8.5	1146000
10862	9725	9.0	1131000
10862	9725	9.5	1158000
10862	9725	10.0	1080000
10862	9725	10.5	1022000
10862	9725	11.0	1075000
10862	9725	11.5	977000
10862	9725	12.0	1063000
10862	9725	12.5	1199000
10862	9725	13.0	1135000
10862	9725	13.5	1012000
10862	9725	14.0	756000
10862	9725	14.5	56000

Borehole B3890R153^d

10869	9686	0.5	21000
10869	9686	1.0	26000
10869	9686	1.5	40000
10869	9686	2.0	33000
10869	9686	2.5	36000
10869	9686	3.0	31000
10869	9686	3.5	20000
10869	9686	4.0	16000
10869	9686	4.5	15000
10869	9686	5.0	13000
10869	9686	5.5	13000
10869	9686	6.0	1000
10869	9686	6.5	13000
10869	9686	7.0	13000
10869	9686	7.5	13000
10869	9686	8.0	14000
10869	9686	8.5	14000
10869	9686	9.0	13000
10869	9686	9.5	13000

Table C-2
(continued)

Page 91 of 108

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R221</u>			
10874	9796	0.5	15000
10874	9796	1.0	19000
10874	9796	1.5	20000
10874	9796	2.0	21000
10874	9796	2.5	15000
10874	9796	3.0	14000
10874	9796	3.5	12000
10874	9796	4.0	11000
10874	9796	4.5	10000
10874	9796	5.0	8000
10874	9796	5.5	9000
10874	9796	6.0	9000
10874	9796	6.5	9000
10874	9796	7.0	10000
10874	9796	7.5	13000
10874	9796	8.0	14000
10874	9796	8.5	14000
10874	9796	9.0	14000
10874	9796	9.5	15000
10874	9796	10.0	17000

Borehole B3890R146^d

10877	9779	0.5	94000
10877	9779	1.0	151000
10877	9779	1.5	163000
10877	9779	2.0	260000
10877	9779	2.5	303000
10877	9779	3.0	286000
10877	9779	3.5	285000
10877	9779	4.0	213000
10877	9779	4.5	140000
10877	9779	5.0	147000
10877	9779	5.5	101000
10877	9779	6.0	72000
10877	9779	6.5	56000
10877	9779	7.0	52000
10877	9779	7.5	41000
10877	9779	8.0	50000
10877	9779	8.5	43000
10877	9779	9.0	64000
10877	9779	9.5	47000

Table C-2
(continued)

Page 92 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R210</u>			
10880	9670	0.5	8000
10880	9670	1.0	13000
10880	9670	1.5	16000
10880	9670	2.0	13000
10880	9670	2.5	13000
10880	9670	3.0	13000
10880	9670	3.5	13000
10880	9670	4.0	12000
10880	9670	4.5	11000
10880	9670	5.0	11000
10880	9670	5.5	9000
10880	9670	6.0	9000
10880	9670	6.5	10000
10880	9670	7.0	11000
10880	9670	7.5	11000
10880	9670	8.0	10000
10880	9670	8.5	11000
10880	9670	9.0	11000
10880	9670	9.5	11000
10880	9670	10.0	12000
<u>Borehole B3890R169^d</u>			
10884	9747	0.5	13000
10884	9747	1.0	14000
10884	9747	1.5	14000
10884	9747	2.0	14000
10884	9747	2.5	14000
10884	9747	3.0	14000
10884	9747	3.5	15000
10884	9747	4.0	15000
10884	9747	4.5	15000
10884	9747	5.0	16000
10884	9747	5.5	17000
<u>Borehole B3890R168^d</u>			
10884	9787	0.5	16000
10884	9787	1.0	10000
10884	9787	1.5	14000
10884	9787	2.0	14000
10884	9787	2.5	13000

Table C-2
(continued)

Page 93 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R168^d</u> (continued)			
10884	9787	3.0	13000
10884	9787	3.5	12000
10884	9787	4.0	11000
10884	9787	4.5	12000
10884	9787	5.0	13000
10884	9787	5.5	14000
<u>Borehole HA099</u>			
10900	9215	0.5	13000
10900	9215	1.0	12000
10900	9215	1.5	11000
10900	9215	2.0	10000
10900	9215	2.5	9000
<u>Borehole HA074</u>			
10900	9230	0.5	17000
10900	9230	1.0	18000
10900	9230	1.5	19000
10900	9230	2.0	22000
10900	9230	2.5	18000
10900	9230	3.0	18000
10900	9230	3.5	20000
<u>Borehole B3890R183^d</u>			
10900	9447	0.5	7000
10900	9447	1.0	9000
10900	9447	1.5	12000
10900	9447	2.0	12000
10900	9447	2.5	12000
10900	9447	3.0	13000
10900	9447	3.5	15000
10900	9447	4.0	12000
10900	9447	4.5	11000
10900	9447	5.0	10000
10900	9447	5.5	10000
10900	9447	6.0	10000
10900	9447	6.5	9000
10900	9447	7.0	10000
10900	9447	7.5	11000

Table C-2
(continued)

Page 94 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R183^d</u> (continued)			
10900	9447	8.5	13000
10900	9447	9.0	13000
10900	9447	9.5	14000
10900	9447	10.0	14000
10900	9447	10.5	12000
<u>Borehole B3890R157^d</u>			
10900	9550	0.5	7000
10900	9550	1.0	12000
10900	9550	1.5	18000
10900	9550	2.0	15000
10900	9550	2.5	11000
10900	9550	3.0	11000
10900	9550	3.5	12000
10900	9550	4.0	10000
10900	9550	4.5	12000
10900	9550	5.0	13000
10900	9550	5.5	13000
10900	9550	6.0	13000
10900	9550	6.5	14000
10900	9550	7.0	14000
10900	9550	7.5	12000
<u>Borehole AS072</u>			
10950	9230	0.5	20000
10950	9230	1.0	25000
10950	9230	1.5	41000
10950	9230	2.0	42000
10950	9230	2.5	46000
10950	9230	3.0	73000
10950	9230	3.5	77000
<u>Borehole B3890R184^d</u>			
10950	9450	0.5	14000
10950	9450	1.0	22000
10950	9450	1.5	24000
10950	9450	2.0	19000
10950	9450	2.5	17000
10950	9450	3.0	16000

Table C-2
(continued)

Page 95 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R184^d</u> (continued)			
10950	9450	3.5	18000
10950	9450	4.0	18000
10950	9450	4.5	16000
10950	9450	5.0	12000
10950	9450	5.5	12000
10950	9450	6.0	11000
10950	9450	6.5	10000
10950	9450	7.0	10000
10950	9450	7.5	10000
10950	9450	8.0	11000
10950	9450	8.5	10000
10950	9450	9.0	11000
10950	9450	9.5	12000
10950	9450	10.0	12000
<u>Borehole AS083</u>			
10955	9215	0.5	9000
10955	9215	1.0	11000
<u>Borehole B3890R201</u>			
10985	9460	0.5	12000
10985	9460	1.0	25000
10985	9460	1.5	31000
10985	9460	2.0	40000
10985	9460	2.5	32000
10985	9460	3.0	18000
10985	9460	3.5	14000
10985	9460	4.0	13000
10985	9460	4.5	13000
10985	9460	5.0	13000
10985	9460	5.5	13000
10985	9460	6.0	12000
10985	9460	6.5	12000
10985	9460	7.0	11000
10985	9460	7.5	11000
10985	9460	8.0	11000
10985	9460	8.5	12000
10985	9460	9.0	13000
10985	9460	9.5	13000
10985	9460	10.0	14000

Table C-2
(continued)

Page 96 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R201 (continued)</u>			
10985	9460	10.5	13000
10985	9460	11.0	11000
10985	9460	11.5	12000
10985	9460	12.0	11000
<u>Borehole B3890R200^d</u>			
10990	9460	0.5	14000
10990	9460	1.0	25000
10990	9460	1.5	32000
10990	9460	2.0	34000
<u>Borehole HA091</u>			
11000	9216	0.5	23000
11000	9216	1.0	28000
11000	9216	1.5	27000
11000	9216	2.0	15000
11000	9216	2.5	11000
<u>Borehole AS084</u>			
11000	9228	0.5	14000
11000	9228	1.0	13000
11000	9228	1.5	10000
11000	9228	2.0	10000
11000	9228	2.5	10000
11000	9228	3.0	10000
11000	9228	3.5	9000
<u>Borehole AS073</u>			
11000	9230	0.5	25000
11000	9230	1.0	25000
11000	9230	1.5	22000
11000	9230	2.0	24000
11000	9230	2.5	31000
11000	9230	3.0	34000
11000	9230	3.5	33000

Table C-2
(continued)

Page 97 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R196^d</u>			
11000	9463	0.5	13000
11000	9463	1.0	25000
11000	9463	1.5	39000
11000	9463	2.0	44000
<u>Borehole B3890R199</u>			
11000	9470	0.5	5000
11000	9470	1.0	21000
11000	9470	1.5	21000
11000	9470	2.0	15000
11000	9470	2.5	12000
11000	9470	3.0	10000
11000	9470	3.5	10000
11000	9470	4.0	10000
11000	9470	4.5	10000
11000	9470	5.0	9000
11000	9470	5.5	5000
11000	9470	6.0	5000
11000	9470	6.5	6000
11000	9470	7.0	6000
11000	9470	7.5	6000
11000	9470	8.0	6000
11000	9470	8.5	6000
11000	9470	9.0	6000
11000	9470	9.5	6000
11000	9470	10.0	7000
11000	9470	10.5	7000
11000	9470	11.0	7000
11000	9470	11.5	7000
11000	9470	12.0	8000
11000	9470	12.5	8000
11000	9470	13.0	8000
11000	9470	13.5	8000
11000	9470	14.0	7000
<u>Borehole B3890R158</u>			
11000	9550	0.5	6000
11000	9550	1.0	9000
11000	9550	1.5	13000

Table C-2
(continued)

Page 98 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R158 (continued)</u>			
11000	9550	2.5	13000
11000	9550	3.0	13000
11000	9550	3.5	14000
11000	9550	4.0	13000
11000	9550	4.5	15000
11000	9550	5.0	15000
11000	9550	5.5	14000
11000	9550	6.0	15000
11000	9550	6.5	15000
11000	9550	7.0	15000
11000	9550	7.5	14000
11000	9550	8.0	14000
11000	9550	8.5	14000
11000	9550	9.0	14000
11000	9550	9.5	13000
11000	9550	10.0	14000
<u>Borehole B3890R179^d</u>			
11001	9453	0.5	20000
11001	9453	1.0	33000
11001	9453	1.5	42000
11001	9453	2.0	23000
11001	9453	2.5	14000
11001	9453	3.0	12000
11001	9453	3.5	12000
<u>Borehole B3890R197^d</u>			
11010	9463	0.5	8000
11010	9463	1.0	13000
11010	9463	1.5	22000
11010	9463	2.0	26000
11010	9463	2.5	28000
11010	9463	3.0	21000
11010	9463	3.5	15000
11010	9463	4.0	13000
11010	9463	4.5	12000
11010	9463	5.0	11000
11010	9463	5.5	11000
11010	9463	6.0	11000
11010	9463	6.5	11000

Table C-2
(continued)

Page 99 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R197^d</u> (continued)			
11010	9463	7.0	11000
11010	9463	7.5	11000
11010	9463	8.0	11000
11010	9463	8.5	11000
11010	9463	9.0	11000
11010	9463	9.5	10000
11010	9463	10.0	10000
<u>Borehole HA092</u>			
11050	9216	0.5	9000
11050	9216	1.0	13000
11050	9216	1.5	17000
11050	9216	2.0	9000
11050	9216	2.5	9000
11050	9216	3.0	8000
<u>Borehole AS082</u>			
11103	9222	0.5	14000
11103	9222	1.0	12000
11103	9222	1.5	9000
11103	9222	2.0	9000
11103	9222	2.5	9000
11103	9222	3.0	8000
11103	9222	3.5	8000
<u>Borehole HA071</u>			
11050	9230	0.5	17000
11050	9230	1.0	14000
11050	9230	1.5	18000
11050	9230	2.0	24000
11050	9230	2.5	26000
11050	9230	3.0	28000
11050	9230	3.5	26000
<u>Borehole B3890R180^d</u>			
11051	9450	0.5	17000
11051	9450	1.0	20000
11051	9450	-	-

Table C-2
(continued)

Page 100 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R180^d (continued)

11051	9450	2.0	28000
11051	9450	2.5	24000
11051	9450	3.0	17000
11051	9450	3.5	16000
11051	9450	4.0	16000
11051	9450	4.5	14000
11051	9450	5.0	13000
11051	9450	5.5	12000
11051	9450	6.0	12000
11051	9450	6.5	11000
11051	9450	7.0	11000
11051	9450	7.5	11000
11051	9450	8.0	10000
11051	9450	8.5	9000
11051	9450	9.0	9000
11051	9450	9.5	9000
11051	9450	10.0	9000
11051	9450	10.5	9000
11051	9450	11.0	9000
11051	9450	11.5	10000
11051	9450	12.0	11000
11051	9450	12.5	11000
11051	9450	13.0	11000
11051	9450	13.5	12000
11051	9450	14.0	11000

Borehole B3890C208

11051	9452	0.5	8000
11051	9452	1.0	14000
11051	9452	1.5	22000
11051	9452	2.0	20000
11051	9452	2.5	19000
11051	9452	3.0	14000
11051	9452	3.5	15000
11051	9452	4.0	13000
11051	9452	4.5	14000
11051	9452	5.0	15000
11051	9452	5.5	15000
11051	9452	6.0	13000
11051	9452	6.5	13000
11051	9452	7.0	13000

Table C-2
(continued)

Page 101 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R195^d</u>			
11087	9497	0.5	10000
11087	9497	1.0	13000
11087	9497	1.5	13000
11087	9497	2.0	15000
11087	9497	2.5	12000
11087	9497	3.0	6000
<u>Borehole B3890R185^d</u>			
11093	9307	0.5	7000
11093	9307	1.0	12000
11093	9307	1.5	16000
11093	9307	2.0	21000
11093	9307	2.5	26000
11093	9307	3.0	43000
11093	9307	3.5	59000
11093	9307	4.0	50000
11093	9307	4.5	38000
11093	9307	5.0	24000
11093	9307	5.5	18000
11093	9307	6.0	16000
11093	9307	6.5	14000
11093	9307	7.0	12000
11093	9307	7.5	11000
11093	9307	8.0	9000
11093	9307	8.5	10000
11093	9307	9.0	12000
11093	9307	9.5	9000
11093	9307	10.0	9000
11093	9307	10.5	10000
11093	9307	11.0	10000
11093	9307	11.5	11000
11093	9307	12.0	10000
11093	9307	12.5	9000
11093	9307	13.0	10000
<u>Borehole AS081</u>			
11095	9250	0.5	16000
11095	9250	1.0	24000
11095	9250	1.5	35000
11095	9250	2.0	30000

Table C-2
(continued)

Page 102 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R186^d</u>			
11095	9350	0.5	11000
11095	9350	1.0	17000
11095	9350	1.5	20000
11095	9350	2.0	21000
11095	9350	2.5	23000
11095	9350	3.0	30000
11095	9350	3.5	36000
11095	9350	4.0	28000
11095	9350	4.5	18000
11095	9350	5.0	14000
11095	9350	5.5	11000
11095	9350	6.0	9000
11095	9350	6.5	9000
11095	9350	7.0	12000
11095	9350	7.5	15000
11095	9350	8.0	15000
11095	9350	8.5	13000
11095	9350	9.0	12000
11095	9350	9.5	13000
11095	9350	10.0	12000
11095	9350	10.5	11000
11095	9350	11.0	11000
11095	9350	11.5	12000
11095	9350	12.0	13000
11095	9350	12.5	13000
<u>Borehole B3890R187^d</u>			
11095	9400	0.5	37000
11095	9400	1.0	49000
11095	9400	1.5	52000
11095	9400	2.0	69000
11095	9400	2.5	77000
11095	9400	3.0	97000
11095	9400	3.5	117000
11095	9400	4.0	166000
11095	9400	4.5	237000
11095	9400	5.0	279000
11095	9400	5.5	312000
11095	9400	6.0	308000
11095	9400	6.5	287000
11095	9400	7.0	266000

Table C-2
(continued)

Page 103 of 108

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R187^d (continued)

11095	9400	7.5	239000
11095	9400	8.0	260000
11095	9400	8.5	263000
11095	9400	9.0	270000
11095	9400	9.5	288000
11095	9400	10.0	305000
11095	9400	10.5	303000
11095	9400	11.0	277000
11095	9400	11.5	266000
11095	9400	12.0	250000
11095	9400	12.5	177000
11095	9400	13.0	113000
11095	9400	13.5	39000
11095	9400	14.0	40000
11095	9400	14.5	36000
11095	9400	15.0	26000
11095	9400	15.5	2000

Borehole B3890R188^d

11095	9410	0.5	29000
11095	9410	1.0	40000
11095	9410	1.5	42000
11095	9410	2.0	67000
11095	9410	2.5	95000
11095	9410	3.0	112000
11095	9410	3.5	118000
11095	9410	4.0	96000
11095	9410	4.5	116000
11095	9410	5.0	181000
11095	9410	5.5	279000
11095	9410	6.0	304000
11095	9410	6.5	257000
11095	9410	7.0	253000
11095	9410	7.5	312000
11095	9410	8.0	274000
11095	9410	8.5	284000
11095	9410	9.0	293000
11095	9410	9.5	293000
11095	9410	10.0	300000
11095	9410	10.5	318000

Table C-2
(continued)

Page 104 of 108

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R188^d (continued)

11095	9410	11.0	298000
11095	9410	11.5	256000
11095	9410	12.0	183000
11095	9410	12.5	89000
11095	9410	13.5	40000
11095	9410	14.0	27000

Borehole B3890R189^d

11095	9420	0.5	11000
11095	9420	1.0	19000
11095	9420	1.5	19000
11095	9420	2.0	17000
11095	9420	2.5	20000
11095	9420	3.0	29000
11095	9420	3.5	56000
11095	9420	4.0	69000
11095	9420	4.5	42000
11095	9420	5.0	20000
11095	9420	5.5	14000
11095	9420	6.0	10000
11095	9420	6.5	8000
11095	9420	7.0	7000
11095	9420	7.5	7000
11095	9420	8.0	7000
11095	9420	8.5	7000
11095	9420	9.0	9000
11095	9420	9.5	11000
11095	9420	10.0	11000
11095	9420	10.5	10000

Borehole B3890R190^d

11095	9430	0.5	9000
11095	9430	1.0	14000
11095	9430	1.5	15000
11095	9430	2.0	16000
11095	9430	2.5	18000
11095	9430	3.0	23000
11095	9430	3.5	22000
11095	9430	4.0	17000
11095	9430	4.5	14000
11095	9430	5.0	13000

Table C-2
(continued)

Page 105 of 108

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R190^d</u> (continued)			
11095	9430	5.5	13000
11095	9430	6.0	11000
11095	9430	6.5	9000
11095	9430	7.0	8000
11095	9430	7.5	8000
11095	9430	8.0	9000
11095	9430	8.5	10000
11095	9430	9.0	11000
11095	9430	9.5	11000
11095	9430	10.0	11000
11095	9430	10.5	10000
<u>Borehole B3890R181^d</u>			
11095	9450	0.5	32000
11095	9450	1.0	35000
11095	9450	1.5	25000
11095	9450	2.0	34000
11095	9450	2.5	33000
11095	9450	3.0	22000
11095	9450	3.5	19000
11095	9450	4.0	18000
11095	9450	4.5	16000
11095	9450	5.0	12000
11095	9450	5.5	10000
11095	9450	6.0	10000
11095	9450	6.5	10000
11095	9450	7.5	11000
11095	9450	8.0	12000
11095	9450	8.5	13000
11095	9450	9.0	13000
11095	9450	9.5	12000
11095	9450	10.0	12000
11095	9450	10.5	12000
11095	9450	11.0	12000
<u>Borehole B3890R198^d</u>			
1095	9470	0.5	171000
1095	9470	1.0	94000
1095	9470	1.5	38000
1095	9470	2.0	23000
1095	9470	2.5	16000

Table C-2
(continued)

Page 106 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R198^d (continued)

11095	9470	3.0	13000
11095	9470	3.5	12000
11095	9470	4.0	12000
11095	9470	4.5	13000
11095	9470	5.0	13000
11095	9470	5.5	12000
11095	9470	6.0	11000
11095	9470	6.5	11000
11095	9470	7.0	11000
11095	9470	7.5	10000
11095	9470	8.0	10000
11095	9470	8.5	13000
11095	9470	9.0	17000
11095	9470	9.5	13000
11095	9470	10.0	14000
11095	9470	10.5	14000
11095	9470	11.0	12000
11095	9470	11.5	12000

Borehole B3890R193

11095	9480	0.5	231000
11095	9480	1.0	163000
11095	9480	1.5	64000
11095	9480	2.0	33000
11095	9480	2.5	21000
11095	9480	3.0	17000
11095	9480	3.5	16000
11095	9480	4.0	14000
11095	9480	4.5	14000
11095	9480	5.0	13000
11095	9480	5.5	11000
11095	9480	6.0	10000
11095	9480	6.5	10000
11095	9480	7.0	10000
11095	9480	7.5	16000
11095	9480	8.0	19000
11095	9480	8.5	15000
11095	9480	9.0	11000
11095	9480	9.5	11000
11095	9480	10.0	11000

Table C-2
(continued)

Page 107 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R194^d</u>			
.1095	9497	0.5	195000
.1095	9497	1.0	108000
.1095	9497	1.5	46000
.1095	9497	2.0	25000
.1095	9497	2.5	17000
.1095	9497	3.0	16000
.1095	9497	3.5	15000
.1095	9497	4.0	13000
.1095	9497	4.5	12000
.1095	9497	5.0	12000
.1095	9497	5.5	14000
.1095	9497	6.0	20000
.1095	9497	6.5	15000
.1095	9497	7.0	14000
.1095	9497	7.5	13000
.1095	9497	8.0	12000
.1095	9497	8.5	11000
.1095	9497	9.0	11000
.1095	9497	9.5	12000
.1095	9497	10.0	12000
.1095	9497	10.5	12000
.1095	9497	11.0	11000
.1095	9497	11.5	7000
<u>Borehole B3890R206^d</u>			
.1095	9509	0.5	8000
.1095	9509	1.0	11000
.1095	9509	1.5	12000
.1095	9509	2.0	11000
.1095	9509	2.5	11000
.1095	9509	3.0	11000
.1095	9509	3.5	11000
.1095	9509	4.0	11000
.1095	9509	4.5	11000
.1095	9509	5.0	11000
.1095	9509	5.5	12000
.1095	9509	6.0	12000
.1095	9509	6.5	12000
.1095	9509	7.0	11000

Table C-2
(continued)

Page 108 of 108

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole HA103</u>			
11107	9350	0.5	8000
11107	9350	1.0	13000
11107	9350	1.5	10000
11107	9350	2.0	9000
11107	9350	2.5	9000
11107	9350	3.0	9000
11107	9350	3.5	7000
<u>Borehole HA101</u>			
11109	9250	0.5	9000
11109	9250	1.0	8000
11109	9250	1.5	7000
11109	9250	2.0	6000
11109	9250	2.5	5000
11109	9250	3.0	6000
11109	9250	3.5	6000
<u>Borehole HA102</u>			
11110	9300	0.5	22000
11110	9300	1.0	26000
11110	9300	1.5	12000
11110	9300	2.0	9000
11110	9300	2.5	8000
11110	9300	3.0	7000
11110	9300	3.5	6000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table C-3
Gamma Radiation Exposure Rates,
Stepan Property

Page 1 of 3

<u>Coordinates^a</u>		<u>Rate^b</u>
East	North	(μ R/h)
9820	9420	13
9820	9520	15
9820	9630	14
9820	9730	10
9880	9520	15
9920	9420	13
9920	9730	14
9930	8980	13
9930	9580	29
9950	9350	17
9980	9230	14
9980	9580	14
9990	9680	15
10020	9520	36
10020	9620	14
10030	9280	13
10070	9420	13
10070	9470	10
10080	9570	14
10080	9720	28
10090	9230	16
10120	9240	14
10120	9570	15
10120	9730	31
10150	9640	17
10170	9280	13
10170	9470	14
10170	9760	93
10220	9770	97
10230	9370	13
10230	9470	17
10250	9550	10
10260	9690	21
10260	9720	26
10270	9230	86
10270	9280	10
10270	9770	109
10280	9430	97
10280	9470	101
10320	9280	16
10320	9370	13
10320	9770	66
10340	9930	146
10340	10020	70
10350	9880	228

Table C-3
(continued)

Page 2 of 3

<u>Coordinates^a</u>		<u>Rate^b</u>
East	North	(μR/h)
10360	9730	39
10370	9240	36
10370	9680	18
10370	9720	27
10380	9430	10
10380	9580	11
10380	9810	41
10420	9380	8
10420	9530	13
10420	9930	21
10430	9770	20
10430	9890	18
10450	9440	9
10460	9700	67
10470	9640	25
10480	9240	36
10480	9280	9
10520	9240	17
10520	9620	14
10530	9580	12
10540	9970	14
10570	9350	9
10570	9490	6
10580	9770	19
10580	9830	14
10620	9230	12
10620	9380	8
10620	10020	18
10630	9540	8
10670	9720	17
10680	9430	6
10680	9660	9
10720	9240	5
10740	9970	11
10760	9870	8
10780	9490	5
10800	9720	30
10800	9770	49
10820	9380	7
10860	9770	37
10880	9470	6
10880	9620	7
10970	9470	7
10970	9570	16
11080	9480	27
11095	9360	7

Table C-3
(continued)

Page 3 of 3

<u>Coordinates^a</u>		Rate ^b
East	North	(μ R/h)
Interior of Buildings		
<u>Building 4</u>		14 12
<u>Building 10</u>		9 7
<u>Building 13</u>		7 5 6 6 7 6 5
<u>Building 14</u>		9 7
<u>Building 20</u>		12 9
<u>Building 1</u>		12 9
<u>Building 52</u>		9 7
<u>Building 52A</u>		9 7
<u>Building 67</u>		19 9

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

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Table C-4

Metals and Rare Earths, Stepan Property Soil Samples

Page 1 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-018 B3890C217 0 - 2	138-STC-019 B3890C217 2 - 4	138-STC-020 B3890C217 4 - 6	138-STC-021 B3890C217 6 - 8	138-STC-022 B3890C218 0 - 2	138-STC-023 B3890C218 2 - 4
Analyte						
Aluminum, Total	6750 =	4260 =	5920 =	5570 =	5540 =	6470 =
Antimony, Total	4.4 R	4.0 R	4.5 R	4.0 R	3.8 R	4.8 R
Arsenic, Total	2.2 R	0.68 R	1.2 R	0.52 R	3.8 R	2.0 R
Barium, Total	50.2 =	18.8 B	34.5 B	30.0 B	49.0 =	37.3 B
Beryllium, Total	0.38 B	0.20 B	0.20 U	0.22 B	0.51 B	0.30 B
Boron, Total	20.2 U	18.5 U	20.2 U	18.3 U	17.5 U	21.7 U
Cadmium, Total	0.81 U	0.74 U	0.81 U	0.73 U	0.70 U	0.87 U
Calcium, Total	1230 =	335 B	624 B	648 B	1480 =	1380 =
Cerium, Total	40.4 U	37.0 U	40.5 U	36.6 U	48.6 =	103 =
Chromium, Total	5.0 =	1.7 B	1.7 B	2.3 =	6.3 J	23.7 =
Cobalt, Total	3.2 B	3.0 B	3.1 B	3.0 B	3.3 B	3.3 B
Copper, Total	7.9 R	5.0 R	6.3 R	5.5 R	19.7 R	8.9 R
Dysprosium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Erbium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Europium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Gadolinium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Holmium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Iron, Total	9250 =	6200 =	5560 =	5780 =	6590 =	8200 =
Lanthanum, Total	40.4 U	37.0 U	40.5 U	36.6 U	52.4 =	55.1 =
Lead, Total	51.9 =	2.6 =	6.2 =	4.2 =	139 =	30.2 =
Lithium, Total	20.2 U	18.5 U	20.2 U	18.3 U	17.5 U	40.7 =
Lutetium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Magnesium, Total	1070 =	1020 =	1080 =	1110 =	843 B	987 B
Manganese, Total	190 J	173 J	218 J	200 J	208 J	121 J
Molybdenum, Total	20.2 U	18.5 U	20.2 U	18.3 U	17.5 U	21.7 U
Neodymium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Nickel, Total	5.2 B	4.6 B	5.0 B	5.1 B	5.9 B	7.0 B
Potassium, Total	337 B	333 B	529 B	435 B	160 U	302 B
Praseodymium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Samarium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Selenium, Total	0.36 BJ	0.36 UJ	0.42 UJ	0.42 UJ	0.61 BJ	0.39 UJ
Silver, Total	0.81 R	0.74 R	0.81 R	0.79 R	0.70 R	0.87 R
Sodium, Total	72.7 B	54.7 B	55 B	68.5 B	41.1 B	55.9 B
Tellurium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Terbium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Thallium, Total	0.73 UJ	0.71 UJ	0.85 UJ	0.83 UJ	8.4 UJ	0.79 UJ
Thulium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Vanadium, Total	11.2 =	5.4 B	5.0 B	5.7 B	9.5 =	7.5 B
Ytterbium, Total	40.4 U	37.0 U	40.5 U	36.6 U	34.9 U	43.4 U
Zinc, Total	37.5 R	12.9 R	14.0 R	12.8 R	80.9 =	47.2 =

Concentration Units - mg/kg - milligrams per kilogram.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

R - Unreliable result. Analyte may or may not be present in the sample.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

J - Analyte present; reported as an estimated value.

... and for but not detected, but must be estimated due to quality control considerations.

Table C-4
(continued)

Page 2 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-024 B3890C218 4 - 6	138-STC-025 B3890C218 6 - 8	138-STC-008 B3890C207 0 - 2	138-STC-009 B3890C207 6 - 8	138-STC-010 B3890C207 10 - 11.2	138-STC-011 B3890C207 11.5 - 13.5
Analyte						
Aluminum, Total	8830 =	44400 =	3570 =	5640 =	3090 =	2530 =
Antimony, Total	5.1 R	7.1 R	4.8 R	14.9 R	5.2 R	5.0 R
Arsenic, Total	26.6 R	1.7 R	10.3 J	11.3 J	2.4 J	2.0 BJ
Barium, Total	59.4 =	115 =	48.3 B	106 =	87.8 =	64.6 =
Beryllium, Total	0.75 B	1.8 =	0.37 B	0.81 B	0.52 B	0.34 B
Boron, Total	23.3 U	32.2 U	21.8 U	22.5 U	23.7 U	22.5 U
Cadmium, Total	0.93 U	1.3 U	0.87 U	0.9 U	0.95 U	0.90 U
Calcium, Total	19800 =	82900 =	12500 =	46500 =	1650 =	2650 =
Cerium, Total	1980 =	4140 =	43.7 U	777 =	47.4 U	62.2 =
Chromium, Total	553 =	1570 =	18.7 =	641 =	7.9 =	31.1 =
Cobalt, Total	4.0 B	3.6 B	4.1 B	3.7 B	6.4 B	4.1 B
Copper, Total	36.0 R	130 R	34.9 R	44.6 R	6.7 R	5.2 R
Dysprosium, Total	46.7 U	75.9 =	43.7 U	44.9 U	47.4 U	45.1 U
Erbium, Total	46.7 U	64.4 U	43.7 U	44.9 U	47.4 U	45.1 U
Europium, Total	46.7 U	64.4 U	43.7 U	44.9 U	47.4 U	45.1 U
Gadolinium, Total	52.4 =	147 =	43.7 U	44.9 U	47.4 U	45.1 U
Holmium, Total	46.7 U	64.4 U	43.7 U	44.9 U	47.4 U	45.1 U
Iron, Total	7780 =	9020 =	7050 =	5910 =	7430 =	5100 =
Lanthanum, Total	1160 =	2420 =	43.7 U	422 =	47.4 U	45.1 U
Lead, Total	28.7 =	319 =	52.0 =	87.2 =	5.2 =	8.1 =
Lithium, Total	159 =	738 =	21.8 U	161 =	23.7 U	22.5 U
Lutetium, Total	46.7 U	64.4 U	1070 =	1090 =	47.4 U	45.1 U
Magnesium, Total	912 B	1040 B	2980 =	1670 =	1030 B	1070 B
Manganese, Total	227 J	168 J	189 =	114 =	262 =	102 =
Molybdenum, Total	23.3 U	32.2 U	21.8 U	22.5 U	23.7 U	22.5 U
Neodymium, Total	702 =	1580 =	43.7 U	285 =	47.4 U	45.1 U
Nickel, Total	11.4 =	35.0 =	10.4 =	10.4 =	7.7 B	7.4 B
Potassium, Total	214 U	454 B	541 B	926 B	536 B	775 B
Praseodymium, Total	46.7 U	64.4 U	43.7 U	44.9 U	47.4 U	45.1 U
Samarium, Total	129 =	300 =	43.7 U	54.1 =	47.4 U	45.1 U
Selenium, Total	0.47 UJ	5.4 UJ	0.43 U	0.45 U	0.47 U	0.46 U
Silver, Total	0.93 R	1.3 R	0.87 U	0.90 U	0.95 U	0.90 U
Sodium, Total	870 B	2950 =	106 B	542 B	587 B	113 B
Tellurium, Total	46.7 U	64.4 U	1070 =	1100 =	47.4 U	45.1 U
Terbium, Total	46.7 U	64.4 U	43.7 U	44.9 U	47.4 U	45.1 U
Thallium, Total	0.93 UJ	1.1 UJ	8.7 R	0.90 R	0.93 R	0.91 R
Thulium, Total	46.7 U	64.4 U	43.7 U	44.9 U	47.4 U	45.1 U
Vanadium, Total	14.6 =	23.7 =	7.3 B	13.8 =	8.5 B	4.1 B
Ytterbium, Total	46.7 U	64.4 U	43.7 U	44.9 U	47.4 U	45.1 U
Zinc, Total	48.0 =	115 =	65.6 =	69.1 =	20.9 R	18.1 R

Concentration Units - mg/kg - milligrams per kilogram.

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R - Unreliable result. Analyte may or may not be present in the sample.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

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Table C-4
(continued)

Page 3 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-012 B3890C207 13.5 - 15.5	138-STC-013 B3890C207 15.5 - 16.5	138-STC-014 B3890C208 0 - 2	138-STC-015 B3890C208 2 - 4	138-STC-016 B3890C208 4 - 6	138-STC-017 B3890C208 6 - 8
Analyte						
Aluminum, Total	4530 =	2670 =	4610 =	1390 =	2270 =	4380 =
Antimony, Total	4.2 R	5.7 R	5.0 R	6.2 R	6.5 R	5.0 R
Arsenic, Total	13.9 J	1.9 BJ	10.5 J	44.9 J	51.7 J	21.9 J
Barium, Total	58.4 =	61.7 =	53.3 =	61.8 =	154 =	128 =
Beryllium, Total	0.45 B	0.37 B	0.41 B	0.31 B	0.51 B	0.23 U
Boron, Total	18.9 U	20.5 U	22.8 U	28.3 U	29.7 U	22.7 U
Cadmium, Total	0.76 U	0.82 U	0.91 U	1.1 U	1.2 U	0.91 U
Calcium, Total	13600 =	6160 =	5700 =	6340 =	3700 =	1250 =
Cerium, Total	393 =	166 =	45.5 U	56.6 U	59.5 U	45.4 U
Chromium, Total	227 =	73.4 =	11.4 =	1.1 U	1.2 U	3.2 =
Cobalt, Total	5.2 B	3.8 B	5.6 B	4.8 B	6.3 B	3.2 B
Copper, Total	13.0 R	9.1 R	58.6 R	43.4 R	64.9 R	22.0 R
Dysprosium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Erbium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Europium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Gadolinium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Holmium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Iron, Total	8560 =	4650 =	12400 =	31700 =	36000 =	12600 =
Lanthanum, Total	198 =	88.7 =	45.5 U	56.6 U	59.5 U	45.4 U
Lead, Total	34.0 =	8.1 =	49.7 =	55.5 R	158 =	11.2 =
Lithium, Total	78.3 =	26.4 =	35.3 =	28.3 U	29.7 U	22.7 U
Lutetium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Magnesium, Total	1470 =	1020 B	3420 =	781 B	771 B	748 B
Manganese, Total	128 =	125 =	135 =	59.2 =	103 =	31.3 =
Molybdenum, Total	18.9 U	20.5 U	22.8 U	28.3 J	29.7 J	22.7 J
Neodymium, Total	152 =	65.2 =	45.5 U	56.6 U	59.5 U	45.4 U
Nickel, Total	10.5 =	7.2 B	12.8 =	7.0 B	10.3 B	4.9 B
Potassium, Total	619 B	687 B	626 B	302 B	845 B	644 B
Praseodymium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Samarium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Selenium, Total	0.45 U	0.45 B	1.4 B	28.8 =	37.1 =	13.9 =
Silver, Total	0.76 U	0.82 U	0.91 U	1.1 U	1.2 U	0.91 U
Sodium, Total	354 B	173 B	262 B	174 B	124 B	71.1 B
Tellurium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Terbium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Thallium, Total	0.90 R	0.86 R	0.92 R	1.1 R	1.2 R	0.89 R
Thulium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Vanadium, Total	7.4 B	4.4 B	8.4 B	1.7 U	1.8 U	1.4 U
Ytterbium, Total	37.9 U	41.0 U	45.5 U	56.6 U	59.5 U	45.4 U
Zinc, Total	26.0 R	22.8 R	57.9 =	32.9 =	49.5 =	14.2 R

Concentration Units - mg/kg - milligrams per kilogram.

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U - The analyte was not detected. The minimum detection limit for the sample is reported.

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! - Analyte present; reported as an estimated value.

Table C-4
(continued)

Page 4 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-036 B3890C255 0 - 2	138-STC-037 B3890C255 4 - 6	138-STC-038 B3890C255 12 - 14	138-STC-045 B3890C296 0 - 2	138-STC-046 B3890C296 4 - 6	138-STC-047 B3890C296 8 - 10
Analyte						
Aluminum, Total	4050 J	6130 J	7330 J	6500 J	4550 J	4660 J
Antimony, Total	4.3 UJ	5.34 J	5.05 J	4.7 UJ	4.4 UJ	4.8 UJ
Arsenic, Total	0.84 BJ	38.4 J	34.6 J	0.44 UJ	0.69 BJ	0.51 BJ
Barium, Total	32.6 BJ	68.7 J	77.7 J	32.9 BJ	23.6 BJ	27.4 BJ
Beryllium, Total	0.37 BJ	0.25 UJ	0.26 BJ	0.36 BJ	0.38 BJ	0.42 BJ
Boron, Total	20.5 U	25.4 U	44.6 =	21.9 U	20.2 U	22.0 U
Cadmium, Total	0.82 UJ	1.02 UJ	0.96 UJ	0.86 UJ	0.81 UJ	0.88 UJ
Calcium, Total	1010 BJ	55900 J	69600 J	1270 J	625 BJ	903 BJ
Cerium, Total	40.9 U	5590 =	5680 =	43.7 U	40.5 U	43.9 U
Chromium, Total	3.5 R	36.9 J	60.0 J	8.5 J	3.9 J	9.8 J
Cobalt, Total	4.1 BJ	44.9 R	71.0 R	6.0 BJ	3.9 BJ	5.4 BJ
Copper, Total	6.6 R	60.1 R	79.6 R	10.6 J	5.5 J	13.6 J
Dysprosium, Total	40.9 U	71.8 =	94.5 =	43.7 U	40.5 U	43.9 U
Erbium, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Europium, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Gadolinium, Total	40.9 U	151 =	192 =	43.7 U	40.5 U	43.9 U
Holmium, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Iron, Total	5530 J	11700 J	30200 J	9740 J	8790 J	10200 J
Lanthanum, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Lead, Total	13.5 R	472 R	27.9 J	0.79 BJ	2.8 J	2.8 J
Lithium, Total	20.5 U	217 =	301 =	21.9 U	20.2 U	22.0 U
Lutetium, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Magnesium, Total	899 BJ	969 BJ	1090 BJ	2090 J	1010 BJ	1970 J
Manganese, Total	336 J	244 J	314 J	201 J	248 J	230 J
Molybdenum, Total	20.5 U	25.4 U	24.1 U	21.9 U	20.2 U	22.0 U
Neodymium, Total	40.9 U	2040 =	2400 =	43.7 U	40.5 U	43.9 U
Nickel, Total	5.9 BJ	17.2 J	50.9 J	10.4 J	6.0 BJ	9.3 J
Potassium, Total	189 BJ	967 BJ	1250 J	275 BJ	474 BJ	519 BJ
Praseodymium, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Samarium, Total	40.9 U	386 =	454 =	43.7 U	40.5 U	43.9 U
Selenium, Total	0.39 UJ	0.51 UJ	0.48 UJ	0.44 J	0.40 J	0.41 J
Silver, Total	1.02 UJ	1.27 U	1.2 U	0.86 UJ	0.81 UJ	0.88 UJ
Sodium, Total	65.8 BJ	5470 J	5080 J	78.6 BJ	72.9 BJ	77.5 BJ
Tellurium, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Terbium, Total	40.9 U	50.9 U	53.0 =	43.7 U	40.5 U	43.9 U
Thallium, Total	0.79 UJ	1.02 UJ	0.96 UJ	0.88 UJ	0.79 UJ	0.82 UJ
Thulium, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Vanadium, Total	4.9 BJ	18.8 J	24.0 J	13.3 =	5.1 B	6.2 BJ
Ytterbium, Total	40.9 U	50.9 U	48.1 U	43.7 U	40.5 U	43.9 U
Zinc, Total	18.2 R	47.9 R	54.2 R	19.0 R	12.9 R	28.1 R

Concentration Units - mg/kg - milligrams per kilogram.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

R - Unreliable result. Analyte may or may not be present in the sample.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table C-4
(continued)

Page 5 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-048 B3890C297 0 - 2	138-STC-049 B3890C297 2 - 4	138-STC-050 B3890C297 4 - 6	138-STC-051 B3890C298 0 - 2	138-STC-052 B3890C298 2 - 4	138-STC-053 B3890C298 4 - 6
Analyte						
Aluminum, Total	5740 J	8440 J	17000 J	6780 J	6150 J	9550 J
Antimony, Total	4.7 UJ	4.0 UJ	4.9 UJ	6.8 UJ	5.1 UJ	4.7 UJ
Arsenic, Total	3.9 J	11.5 J	46.1 J	3.6 J	3.3 J	1.8 BJ
Barium, Total	56.0 J	82.4 J	109 J	68.3 J	71.9 J	113 J
Beryllium, Total	0.45 BJ	0.92 J	1.8 J	0.52 U	0.48 BJ	1.4 J
Boron, Total	21.4 U	18.1 U	22.2 U	30.8 U	23.0 U	21.4 U
Cadmium, Total	0.86 UJ	0.72 UJ	0.89 UJ	1.2 UJ	0.92 UJ	0.86 UJ
Calcium, Total	1910 J	19800 J	82600 J	2430 J	3190 J	25800 J
Cerium, Total	42.8 U	1490 =	6620 =	67.4 =	216 =	5820 =
Chromium, Total	7.2 J	11.9 J	1.7 BJ	9.8 J	9.0 J	13.0 J
Cobalt, Total	4.6 BJ	5.6 BJ	5.0 BJ	6.3 BJ	5.5 BJ	9.0 BJ
Copper, Total	18.0 J	44.6 J	96.2 J	18.8 J	17.5 J	58.6 J
Dysprosium, Total	42.8 U	36.1 U	88.6 =	61.6 U	46.0 U	76.5 =
Erbium, Total	42.8 U	36.1 U	44.4 U	61.6 U	46.0 U	42.9 U
Europium, Total	42.8 U	36.1 U	44.4 U	61.6 U	46.0 U	42.9 U
Gadolinium, Total	42.8 U	36.2 =	167 =	61.6 U	46.0 U	158 =
Holmium, Total	42.8 =	36.1 =	44.4 U	61.6 U	46.0 U	42.9 U
Iron, Total	10300 J	8570 J	6620 J	12900 J	8220 J	6380 J
Lanthanum, Total	42.8 U	995 =	3770 =	61.6 U	137 =	3520 =
Lead, Total	97.7 J	170 J	328 J	91.9 J	37.5 J	243 J
Lithium, Total	21.4 U	124 =	383 =	30.8 U	49.3 =	197 =
Lutetium, Total	42.8 U	36.1 U	44.4 U	61.6 U	46.0 U	42.9 U
Magnesium, Total	1130 J	1340 J	1790 J	1490 B	1190 J	1010 BJ
Manganese, Total	221 J	280 J	402 J	381 J	338 J	861 J
Molybdenum, Total	21.4 U	18.1 U	22.2 U	30.8 U	23.0 U	21.4 U
Neodymium, Total	42.8 U	490 =	2130 =	61.6 U	81.1 =	1830 =
Nickel, Total	7.2 BJ	14.2 J	22.6 J	10.5 BJ	7.3 BJ	12.7 J
Potassium, Total	366 BJ	612 BJ	827 BJ	650 BJ	414 BJ	462 BJ
Praseodymium, Total	42.8 U	36.1 U	44.4 U	61.6 U	46.0 U	42.9 U
Samarium, Total	42.8 U	94.8 =	44.4 U	61.6 U	46.0 U	42.9 U
Selenium, Total	0.42 B	0.47 UJ	0.41 UJ	0.62 J	0.38 UJ	0.51 UJ
Silver, Total	0.86 UJ	0.72 UJ	0.89 UJ	1.2 UJ	1.7 BJ	0.86 U
Sodium, Total	79.9 BJ	680 BJ	2950 J	110 BJ	146 BJ	1180 J
Tellurium, Total	42.8 U	36.1 U	44.4 U	61.6 U	46.0 U	42.9 U
Terbium, Total	42.8 U	36.1 U	58.9 =	61.6 U	46.0 U	45.3 =
Thallium, Total	8.4 UJ	9.4 UJ	8.2 UJ	1.2 UJ	7.7 UJ	10.3 UJ
Thulium, Total	42.8 U	36.1 U	44.4 U	61.6 U	46.0 U	42.9 U
Vanadium, Total	10.1 BJ	13.6 J	32.8 J	11.5 BJ	8.4 BJ	23.5 J
Ytterbium, Total	42.8 U	36.1 U	44.4 U	61.6 U	46.0 U	42.9 U
Zinc, Total	107 J	101 J	94.6 J	106 J	51.4 J	58.4 J

Concentration Units - mg/kg - milligrams per kilogram.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

R - Unreliable result. Analyte may or may not be present in the sample.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected. but must be estimated due to quality control considerations.

Table C-4
(continued)

Page 6 of 7

Sample ID No.	138-STC-054	138-STC-060	138-STC-061	138-STC-063	138-STC-064	138-STC-065
Borehole ID No.	B3890C298	B3890C299	B3890C299	B3890C299	B3890C299	B3890C701
Sample Depth (ft)	14 - 16	0 - 2	2 - 4	6 - 8	8 - 10	0 - 2
Analyte						
Aluminum, Total	2710 J	6930 J	7850 J	5220 J	3710 J	7390 J
Antimony, Total	4.5 UJ	4.9 UJ	4.8 UJ	5.0 U	4.8 UJ	5.1 UJ
Arsenic, Total	0.39 UJ	7.0 J	4.1 J	3.0 J	1.3 BJ	25.3 J
Barium, Total	25.3 BJ	92.3 J	114 J	167 J	77.1 J	74.3 J
Beryllium, Total	0.23 B	0.72 B	0.81 B	0.50 B	0.39 B	0.77 B
Boron, Total	20.5 U	22.4 U	21.9 U	22.6 U	21.9 U	23.2 U
Cadmium, Total	0.82 U	1.0 B	0.88 U	0.90 U	0.87 U	2.1 =
Calcium, Total	3660 J	16500 J	16500 J	2140 J	1230 J	15400 J
Cerium, Total	41.1 U	44.9 U	142 =	45.3 U	43.7 U	46.4 U
Chromium, Total	8.1 J	80.6 J	14.7 J	12.5 J	5.5 J	49.3 J
Cobalt, Total	2.0 B	10.3 B	7.5 B	6.7 B	4.8 B	8.9 B
Copper, Total	7.5 J	57.4 J	35.8 J	11.9 J	5.7 J	45.7 J
Dysprosium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Erbium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Europium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Gadolinium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Holmium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Iron, Total	7110 J	13900 J	9830 J	11600 J	5860 J	10600 J
Lanthanum, Total	41.1 U	44.9 U	81.8 =	45.3 U	43.7 U	46.4 U
Lead, Total	4.5 R	193 J	121 J	22.4 R	3.2 R	165 J
Lithium, Total	69.9 =	22.4 U	21.9 U	22.6 U	21.9 U	24.7 =
Lutetium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Magnesium, Total	512 BJ	3720 J	1810 J	1280 J	966 BJ	2270 J
Manganese, Total	229 J	382 J	386 J	267 J	152 J	257 J
Molybdenum, Total	20.5 U	22.4 U	21.9 U	22.6 U	21.9 U	23.2 U
Neodymium, Total	41.1 U	44.9 U	46.2 =	45.3 U	43.7 U	46.4 U
Nickel, Total	5.6 B	21.2 =	13.9 =	8.0 B	6.5 B	15.8 =
Potassium, Total	208 B	673 B	1480 =	676 B	383 B	809 B
Praseodymium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Samarium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Selenium, Total	0.39 UJ	0.92 J	0.45 UJ	0.54 BJ	0.45 UJ	0.83 BJ
Silver, Total	0.82 UJ	1.3 BJ	0.88 UJ	1.4 B	0.87 UJ	0.93 UJ
Sodium, Total	139 B	386 B	417 B	338 B	270 B	274 B
Tellurium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Terbium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Thallium, Total	7.8 UJ	8.7 UJ	8.9 UJ	0.90 UJ	0.90 UJ	15.0 BJ
Thulium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Vanadium, Total	5.8 B	16.8 =	15.8 =	15.9 =	4.3 B	12.7 =
Ytterbium, Total	41.1 U	44.9 U	43.8 U	45.3 U	43.7 U	46.4 U
Zinc, Total	7.7 J	238 J	64.5 J	26.2 J	15.2 J	111 J

Concentration Units - mg/kg - milligrams per kilogram.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

R - Unreliable result. Analyte may or may not be present in the sample.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

J - Analyte present: reported as an estimated value.

Table C-4
(continued)

Page 7 of 7

Sample ID No.	138-STC-066		138-STC-068		138-STC-069
Borehole ID No.	B3890C701		B3890C701		B3890C701
Sample Depth (ft)	2 - 4		6 - 8		8 - 10
Analyte					
Aluminum, Total	5880 J		5250 J		3490 J
Antimony, Total	5.0 UJ		5.1 UJ		5.1 UJ
Arsenic, Total	5.2 J		3.6 J		0.43 J
Barium, Total	57.7 J		69.6 J		69.8 J
Beryllium, Total	0.66 B		0.44 B		0.33 B
Boron, Total	22.9 U		23.0 U		23.4 U
Cadmium, Total	0.92 U		0.92 U		0.94 U
Calcium, Total	14700 J		1690 J		1020 BJ
Cerium, Total	45.8 U		46.0 U		46.8 U
Chromium, Total	6.0 J		19.6 J		6.7 J
Cobalt, Total	5.2 B		5.5 B		3.6 B
Copper, Total	24.1 J		10.5 J		7.0 J
Dysprosium, Total	45.8 U		46.0 U		46.8 U
Erbium, Total	45.8 U		46.0 U		46.8 U
Europium, Total	45.8 U		46.0 U		46.8 U
Gadolinium, Total	45.8 U		46.0 U		46.8 U
Holmium, Total	45.8 U		46.0 U		46.8 U
Iron, Total	8100 J		9730 J		6780 J
Lanthanum, Total	45.8 U		46.0 U		46.8 U
Lead, Total	60.2 J		6.6 R		0.42 R
Lithium, Total	22.9 U		23.0 U		23.4 U
Lutetium, Total	45.8 U		46.0 U		46.8 U
Magnesium, Total	1130 BJ		1280 J		901 BJ
Manganese, Total	190 J		135 J		161 J
Molybdenum, Total	22.9 U		23.0 U		23.4 U
Neodymium, Total	45.8 U		46.0 U		46.8 U
Nickel, Total	9.5 =		8.1 B		4.9 B
Potassium, Total	817 B		466 B		509 B
Praseodymium, Total	45.8 U		46.0 U		46.8 U
Samarium, Total	45.8 U		46.0 U		46.8 U
Selenium, Total	0.84 BJ		1.5 J		0.07 UJ
Silver, Total	0.92 UJ		0.92 UJ		0.94 UJ
Sodium, Total	205 B		204 B		321 B
Tellurium, Total	45.8 U		46.0 U		46.8 U
Terbium, Total	45.8 U		46.0 U		46.8 U
Thallium, Total	9.1 UJ		0.88 R		1.5 UJ
Thulium, Total	45.8 U		46.0 U		46.8 U
Vanadium, Total	10.0 B		11.2 B		5.8 B
Ytterbium, Total	45.8 U		46.0 U		46.8 U
Zinc, Total	44.1 J		23.9 J		13.9 J

Concentration Units - mg/kg - milligrams per kilogram.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

R - Unreliable result. Analyte may or may not be present in the sample.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table C-5
 Volatile Organic Compounds,
 Stepan Property
 Soil Samples

Page 1 of 2

Sample ID No.	138-STC-008		138-STC-045		138-STC-060		138-STC-061		138-STC-062		138-STC-063	
Borehole ID No.	B3890C207		B3890C296		B3890C299		B3890C299		B3890C299		B3890C299	
Sample Depth (ft)	0 - 2		0 - 2		0 - 2		2 - 4		4 - 6		6 - 8	
Analyte												
1,1,1-TRICHLOROETHANE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
1,1,2,2-TETRACHLOROETHANE	6	U	6	UJ	6	UJ	6	UJ	6	UJ	6	U
1,1,2-TRICHLOROETHANE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
1,1-DICHLOROETHANE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
1,1-DICHLOROETHYLENE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
1,2-DICHLOROETHANE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
1,2-DICHLOROETHENE (TOTAL)	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
1,2-DICHLOROPROPANE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
2-BUTANONE	11	U	11	U	12	UJ	11	UJ	18	J	11	U
2-CHLOROETHYL VINYLETHER	11	U	11	U	12	UJ	11	UJ	12	UJ	11	U
2-HEXANONE	11	U	11	UJ	12	UJ	11	UJ	110	J	11	U
4-METHYL-2-PENTANONE	11	UJ	11	UJ	12	UJ	11	UJ	12	UJ	11	U
ACETONE	480	J	10	UJ	39	UJ	51	UJ	160	UJ	30	UJ
ACROLEIN	11	U	11	UJ	12	UJ	11	UJ	12	UJ	11	U
ACRYLONITRILE	11	U	11	UJ	12	UJ	11	UJ	12	UJ	11	U
BENZENE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
BROMODICHLOROMETHANE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
BROMOFORM	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
BROMOMETHANE	11	U	11	U	12	UJ	11	UJ	12	UJ	11	U
CARBON DISULFIDE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
CARBON TETRACHLORIDE	6	U	6	U	3	J	6	UJ	16	J	6	U
CHLOROBENZENE	6	U	6	UJ	6	UJ	6	UJ	6	UJ	6	U
CHLOROETHANE	11	U	11	U	12	UJ	11	UJ	12	UJ	11	U
CHLOROFORM	6	U	6	U	1	J	6	UJ	5	J	6	U
CHLOROMETHANE	11	U	11	U	12	UJ	11	UJ	12	UJ	11	U
CIS-1,3-DICHLOROPROPENE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
DIBROMOCHLOROMETHANE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
ETHYLBENZENE	6	U	6	UJ	6	UJ	6	UJ	6	UJ	6	U
METHYLENE CHLORIDE	31	UJ	35	U	20	UJ	21	UJ	27	UJ	17	UJ
STYRENE	6	U	6	UJ	6	UJ	6	UJ	6	UJ	6	U
TETRACHLOROETHYLENE	6	U	15	J	6	UJ	6	UJ	6	UJ	2	J
TOLUENE	6	U	190	J	2	UJ	2	UJ	8	J	6	U
TRANS-1,3-DICHLOROPROPENE	6	U	6	U	6	UJ	6	UJ	6	UJ	6	U
TRICHLOROETHYLENE	6	U	1	J	6	UJ	6	UJ	2	J	6	U
VINYL ACETATE	11	U	11	U	12	UJ	11	UJ	12	UJ	11	U
VINYL CHLORIDE	11	U	11	U	12	UJ	11	UJ	12	UJ	11	U
XYLENES (TOTAL)	6	U	3	J	6	UJ	6	UJ	6	UJ	6	U

Concentration Units - µg/kg - micrograms per kilogram.

R - Unreliable result. Analyte may or may not be present in the sample.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table C-5
(continued)

Page 2 of 2

Sample ID No.	138-STC-064		138-STC-065		138-STC-066		138-STC-067		138-STC-068		138-STC-069	
Borehole ID No.	B3890C299		B3890C701		B3890C701		B3890C701		B3890C701		B3890C701	
Sample Depth (ft)	8 - 10		0 - 2		2 - 4		4 - 6		6 - 8		8 - 10	
Analyte												
1,1,1-TRICHLOROETHANE	6	U	6	UJ	6	U	28	U	6	U	6	U
1,1,2,2-TETRACHLOROETHANE	6	U	6	UJ	6	U	28	U	6	U	6	U
1,1,2-TRICHLOROETHANE	6	U	6	UJ	6	U	28	U	6	U	6	U
1,1-DICHLOROETHANE	6	U	6	UJ	6	U	28	U	6	U	6	U
1,1-DICHLOROETHYLENE	6	U	6	UJ	6	U	28	U	6	U	6	U
1,2-DICHLOROETHANE	6	U	6	UJ	6	U	28	U	6	U	6	U
1,2-DICHLOROETHENE (TOTAL)	6	U	6	UJ	6	U	28	U	6	U	6	U
1,2-DICHLOROPROPANE	6	U	6	UJ	6	U	28	U	6	U	6	U
2-BUTANONE	11	U	96	J	13	U	56	U	12	U	12	U
2-CHLOROETHYLVINYLETHER	11	U	12	UJ	13	U	56	U	12	U	12	U
2-HEXANONE	11	U	21	UJ	13	U	56	U	12	U	12	U
4-METHYL-2-PENTANONE	11	U	12	UJ	13	U	56	U	12	U	12	U
ACETONE	69	UJ	100	UJ	51	UJ	56	R	73	UJ	70	UJ
ACROLEIN	11	U	12	UJ	13	U	56	U	12	U	12	UJ
ACRYLONITRILE	11	U	12	UJ	13	U	56	U	12	U	12	UJ
BENZENE	6	U	87	J	6	U	28	U	6	U	6	U
BROMODICHLOROMETHANE	6	U	6	UJ	6	U	28	U	6	U	6	U
BROMOFORM	6	U	6	UJ	6	U	28	U	6	U	6	U
BROMOMETHANE	11	U	12	UJ	13	U	56	U	12	U	12	U
CARBON DISULFIDE	6	U	6	UJ	6	U	28	U	6	U	3	J
CARBON TETRACHLORIDE	6	U	6	UJ	6	U	28	U	6	U	6	U
CHLOROBENZENE	6	U	6	UJ	6	U	28	U	6	U	6	U
CHLOROETHANE	11	U	12	UJ	13	U	56	U	12	U	12	U
CHLOROFORM	6	U	6	UJ	6	U	28	U	6	U	6	U
CHLOROMETHANE	11	U	12	UJ	13	U	56	U	12	U	12	U
CIS-1,3-DICHLOROPROPENE	6	U	6	UJ	6	U	28	U	6	U	6	U
DIBROMOCHLOROMETHANE	6	U	6	UJ	6	U	28	U	6	U	6	U
ETHYLBENZENE	6	U	6	UJ	6	U	28	U	6	U	6	U
METHYLENE CHLORIDE	21	UJ	34	UJ	27	UJ	110	B	25	UJ	30	UJ
STYRENE	6	U	6	UJ	6	U	28	U	6	U	6	U
TETRACHLOROETHYLENE	6	U	3	UJ	2	J	28	U	6	U	6	U
TOLUENE	6	U	10	J	2	J	9	J	6	U	1	J
TRANS-1,3-DICHLOROPROPENE	6	U	6	UJ	6	U	28	U	6	U	6	U
TRICHLOROETHYLENE	6	U	6	UJ	2	J	30	=	6	U	6	U
VINYL ACETATE	11	U	12	UJ	13	U	56	U	12	U	12	U
VINYL CHLORIDE	11	U	12	UJ	13	U	56	U	12	U	12	U
XYLENES (TOTAL)	6	U	6	UJ	6	U	28	U	6	U	1	J

Concentration Units - µg/kg - micrograms per kilogram.

- R - Unreliable result. Analyte may or may not be present in the sample.
- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- B - The analyte is found in the associated blank as well as the sample.
- = - No data qualifier required.

Table C-6
BNAEs,
Stepan Property
Soil Samples

Page 1 of 4

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-008 B3890C207 0 - 2	138-STC-045 B3890C296 0 - 2	138-STC-054 B3890C298 14 - 16	138-STC-060 B3890C299 0 - 2	138-STC-061 B3890C299 2 - 4	138-STC-063 B3890C299 6 - 8
Analyte						
1,2,4-TRICHLOROBENZENE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
1,2-DICHLOROBENZENE	1900 UJ	410 U	340 U	3900 U	1900 U	110 J
1,2-DIPHENYLHYDRAZINE	1900 U	410 U	340 U	3900 U	1900 U	370 U
1,3-DICHLOROBENZENE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
1,4-DICHLOROBENZENE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
2,4,5-TRICHLOROPHENOL	9600 UJ	2000 U	1700 U	19000 U	9300 U	1800 U
2,4,6-TRICHLOROPHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
2,4-DICHLOROPHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
2,4-DIMETHYLPHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
2,4-DINITROPHENOL	9600 UJ	2000 U	1700 U	19000 U	9300 U	1800 U
2,4-DINITROTOLUENE	1900 U	410 U	340 U	3900 U	1900 U	370 U
2,6-DINITROTOLUENE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
2-CHLORONAPHTHALENE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
2-CHLOROPHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
2-METHYLNAPHTHALENE	220 J	410 U	340 U	3900 U	1900 U	370 U
2-METHYLPHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
2-NITROANILINE	9600 UJ	2000 U	1700 U	19000 U	9300 U	1800 U
2-NITROPHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
3,3'-DICHLOROBENZIDINE	3800 U	810 U	690 UJ	7800 U	3700 U	740 UJ
3-NITROANILINE	9600 UJ	2000 U	1700 U	19000 U	9300 U	1800 U
4,6-DINITRO-2-METHYLPHENOL	9600 U	2000 U	1700 U	19000 U	9300 U	1800 U
4-BROMOPHENYL-PHENYLETHER	1900 U	410 U	340 U	3900 U	1900 U	370 U
4-CHLORO-3-METHYLPHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
4-CHLOROANILINE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
4-CHLOROPHENYL-PHENYLETHER	1900 U	410 U	340 U	3900 U	1900 U	370 U
4-METHYLPHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
4-NITROANILINE	9600 U	2000 U	1700 U	19000 U	9300 U	1800 U
4-NITROPHENOL	9600 U	2000 U	1700 U	19000 U	9300 U	1800 U
ACENAPHTHENE	2100 J	410 U	340 U	3900 U	1100 J	370 U
ACENAPHTHYLENE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
ANTHRACENE	5700 =	410 U	340 U	3900 U	2300 =	370 U
BENZIDINE	9600 U	2000 U	1700 R	19000 R	9300 R	1800 R
BENZO(A)ANTHRACENE	9000 =	410 U	340 U	420 J	5100 =	120 J
BENZO(A)PYRENE	9400 =	410 UJ	340 U	3900 U	3600 =	63 J
BENZO(B)FLUORANTHENE	7600 =	410 UJ	340 U	3900 U	2700 =	75 J
BENZO(G,H,I)PERYLENE	4800 =	410 UJ	340 U	3900 U	1800 J	370 UJ

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
J - Analyte present; reported as an estimated value.

Table C-6
(continued)

Page 2 of 4

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-008 B3890C207 0 - 2	138-STC-045 B3890C296 0 - 2	138-STC-054 B3890C298 14 - 16	138-STC-060 B3890C299 0 - 2	138-STC-061 B3890C299 2 - 4	138-STC-063 B3890C299 6 - 8
Analyte						
BENZO(K)FLUORANTHENE	7200 =	410 UJ	340 U	3900 U	2800 =	71 J
BENZOIC ACID	9600 UJ	2000 U	1700 U	19000 U	9300 U	210 J
BENZYL ALCOHOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
BIS(2-CHLOROETHOXY)METHANE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
BIS(2-CHLOROETHYL)ETHER	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
BIS(2-CHLOROISOPROPYL)ETHER	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
BIS(2-ETHYLHEXYL)PHTHALATE	1900 U	410 U	140 J	3900 U	1900 U	69 J
BUTYLBENZYLPHthalate	1900 U	410 U	340 U	3900 U	1900 U	370 U
CHRYSENE	9200 =	410 U	340 U	1400 J	5200 =	140 J
DI-N-BUTYLPHthalate	5800 =	410 U	340 U	3900 U	1900 U	370 U
DI-N-OCTYLPHthalate	1900 U	410 UJ	340 U	3900 U	1900 U	370 UJ
DIBENZ(A,H)ANTHRACENE	470 J	410 UJ	340 U	3900 U	270 J	370 UJ
DIBENZOFURAN	1300 J	410 U	340 U	3900 U	400 J	370 U
DIETHYLPHthalate	1900 U	410 U	340 U	3900 U	1900 U	370 U
DIMETHYLPHthalate	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
FLUORANTHENE	25000 =	410 U	340 U	3900 U	12000 =	270 J
FLUORENE	2400 =	410 U	340 U	3900 U	750 J	370 U
HEXACHLOROBENZENE	1900 U	410 U	340 U	3900 U	1900 U	370 U
HEXACHLOROBUTADIENE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
HEXACHLOROCYClopentadiene	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
HEXACHLOROETHANE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
INDENO(1,2,3-CD)PYRENE	5000 =	410 UJ	340 U	3900 U	1500 J	370 UJ
ISOPHORONE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
N-NITROSO-DI-N-PROPYLAMINE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
N-NITROSODIMETHYLAMINE	1900 U	410 U	340 U	3900 U	1900 U	370 U
N-NITROSODIPHENYLAMINE	1900 U	410 U	340 U	3900 U	1900 U	370 U
NAPHTHALENE	1000 J	410 U	340 U	3900 U	1900 U	370 U
NITROBENZENE	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
PENTACHLOROPHENOL	9600 U	2000 U	1700 U	19000 U	620 J	1800 U
PHENANTHRENE	21000 =	410 U	340 U	570 J	13000 =	230 J
PHENOL	1900 UJ	410 U	340 U	3900 U	1900 U	370 U
PYRENE	15000 =	410 U	47 J	770 J	11000 =	200 J

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

Table C-6
(continued)

Page 3 of 4

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-064 B3890C299 8 - 10	138-STC-065 B3890C701 0 - 2	138-STC-066 B3890C701 2 - 4	138-STC-068 B3890C701 6 - 8	138-STC-069 B3890C701 8 - 10
Analyte					
1,2,4-TRICHLOROBENZENE	360 U	7500 U	390 U	3800 U	370 U
1,2-DICHLOROBENZENE	360 U	7500 U	390 U	3800 U	370 U
1,2-DIPHENYLHYDRAZINE	360 U	7500 U	94 J	3800 U	370 U
1,3-DICHLOROBENZENE	360 U	7500 U	390 U	3800 U	370 U
1,4-DICHLOROBENZENE	360 U	7500 U	390 U	3800 U	370 U
2,4,5-TRICHLOROPHENOL	1800 U	38000 U	2000 U	19000 U	1900 U
2,4,6-TRICHLOROPHENOL	360 U	7500 U	390 U	3800 U	370 U
2,4-DICHLOROPHENOL	360 U	7500 U	390 U	3800 U	370 U
2,4-DIMETHYLPHENOL	360 U	7500 U	390 U	3800 U	370 U
2,4-DINITROPHENOL	1800 U	38000 U	2000 U	19000 U	1900 U
2,4-DINITROTOLUENE	360 U	7500 U	390 U	3800 U	370 U
2,6-DINITROTOLUENE	360 U	7500 U	390 U	3800 U	370 U
2-CHLORONAPHTHALENE	360 U	7500 U	390 U	3800 U	370 U
2-CHLOROPHENOL	360 U	7500 U	390 U	3800 U	370 U
2-METHYLNAPHTHALENE	360 U	7500 U	390 U	3800 U	370 U
2-METHYLPHENOL	360 U	7500 U	390 U	3800 U	370 U
2-NITROANILINE	1800 U	38000 U	2000 U	19000 U	1900 U
2-NITROPHENOL	360 U	7500 U	390 U	3800 U	370 U
3,3'-DICHLOROBENZIDINE	730 UJ	15000 U	780 U	7700 U	740 U
3-NITROANILINE	1800 U	38000 U	2000 U	19000 U	1900 U
4,6-DINITRO-2-METHYLPHENOL	1800 U	38000 U	2000 U	19000 U	1900 U
4-BROMOPHENYL-PHENYLETHER	360 U	7500 U	390 U	3800 U	370 U
4-CHLORO-3-METHYLPHENOL	360 U	7500 U	390 U	3800 U	370 U
4-CHLOROANILINE	360 U	7500 U	390 U	3800 U	370 U
4-CHLOROPHENYL-PHENYLETHER	360 U	7500 U	390 U	3800 U	370 U
4-METHYLPHENOL	360 U	7500 U	390 U	3800 U	370 U
4-NITROANILINE	1800 U	38000 U	2000 U	19000 U	1900 U
4-NITROPHENOL	1800 U	38000 U	2000 U	19000 U	1900 U
ACENAPHTHENE	360 U	7500 U	390 U	3800 U	370 U
ACENAPHTHYLENE	360 U	7500 U	390 U	3800 U	370 U
ANTHRACENE	360 U	7500 U	390 U	3800 U	370 U
BENZIDINE	1800 R	38000 R	2000 R	19000 R	1900 R
BENZO(A)ANTHRACENE	360 U	3300 J	390 U	3800 U	370 U
BENZO(A)PYRENE	360 U	7500 U	390 U	3800 U	370 U
BENZO(B)FLUORANTHENE	360 U	7500 U	390 U	3800 U	370 U
BENZO(G,H,I)PERYLENE	360 U	7500 U	390 U	3800 U	370 U

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

= - No data qualifier required.

Table C-6
(continued)

Page 4 of 4

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-064 B3890C299 8 - 10	138-STC-065 B3890C701 0 - 2	138-STC-066 B3890C701 2 - 4	138-STC-068 B3890C701 6 - 8	138-STC-069 B3890C701 8 - 10
Analyte					
BENZO(K)FLUORANTHENE	360 U	7500 U	390 U	3800 U	370 U
BENZOIC ACID	1800 U	38000 U	2000 U	19000 U	1900 U
BENZYL ALCOHOL	360 U	7500 U	390 U	3800 U	370 U
BIS(2-CHLOROETHOXY)METHANE	360 U	7500 U	390 U	3800 U	370 U
BIS(2-CHLOROETHYL)ETHER	360 U	7500 U	390 U	3800 U	370 U
BIS(2-CHLOROISOPROPYL)ETHER	360 U	7500 U	390 U	3800 U	370 U
BIS(2-ETHYLHEXYL)PHTHALATE	360 U	7500 U	64 J	3800 U	370 U
BUTYLBENZYLPHthalATE	360 U	7500 U	390 U	3800 U	370 U
CHRYSENE	360 U	7500 U	390 U	580 J	370 U
DI-N-BUTYLPHthalATE	360 U	7500 U	57 J	3800 U	370 U
DI-N-OCTYLPHthalATE	360 U	7500 U	390 U	3800 U	370 U
DIBENZ(A,H)ANTHRACENE	360 U	7500 U	390 U	3800 U	370 U
DIBENZOFURAN	360 U	7500 U	390 U	3800 U	370 U
DIETHYLPHthalATE	360 U	7500 U	390 U	3800 U	370 U
DIMETHYLPHthalATE	360 U	7500 U	390 U	3800 U	370 U
FLUORANTHENE	360 U	7500 U	390 U	3800 U	370 U
FLUORENE	360 U	7500 U	390 U	3800 U	370 U
HEXACHLORO BENZENE	360 U	7500 U	390 U	3800 U	370 U
HEXACHLOROBUTADIENE	360 U	7500 U	390 U	3800 U	370 U
HEXACHLOROCYCLOPENTADIENE	360 U	7500 U	390 U	3800 U	370 U
HEXACHLOROETHANE	360 U	7500 U	390 U	3800 U	370 U
INDENO(1,2,3-CD)PYRENE	360 U	7500 U	390 U	3800 U	370 U
ISOPHORONE	360 U	7500 U	390 U	3800 U	370 U
N-NITROSO-DI-N-PROPYLAMINE	360 U	7500 U	390 U	3800 U	370 U
N-NITROSODIMETHYLAMINE	360 U	7500 U	390 U	3800 U	370 U
N-NITROSODIPHENYLAMINE	360 U	7500 U	390 U	3800 U	370 U
NAPHTHALENE	360 U	7500 U	390 U	3800 U	370 U
NITROBENZENE	360 U	7500 U	390 U	3800 U	370 U
PENTACHLOROPHENOL	1800 U	38000 U	2000 U	19000 U	1900 U
PHENANTHRENE	360 U	7500 U	390 U	3800 U	370 U
PHENOL	360 U	7500 U	390 U	3800 U	370 U
PYRENE	360 U	910 J	390 U	3800 U	370 U

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

Table C-7
PCBs, Stepan Property
Soil Samples

Page 1 of 4

Sample ID No.	138-STC-018	138-STC-019	138-STC-020	138-STC-021	138-STC-022	138-STC-023
Borehole ID No.	B3890C217	B3890C217	B3890C217	B3890C217	B3890C218	B3890C218
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4
Analyte						
AROCLOR-1016	45 U	42 U	48 U	44 U	44 U	85 U
AROCLOR-1221	45 U	42 U	48 U	44 U	44 U	85 U
AROCLOR-1232	45 U	42 U	48 U	44 U	44 U	85 U
AROCLOR-1242	45 U	42 U	48 U	44 U	44 U	85 U
AROCLOR-1248	45 U	42 U	48 U	44 U	44 U	85 U
AROCLOR-1254	90 U	84 U	96 U	88 U	87 U	170 U
AROCLOR-1260	90 U	84 U	96 U	88 U	87 U	170 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-7
(continued)

Page 2 of 4

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-024 B3890C218 4 - 6	138-STC-025 B3890C218 6 - 8	138-STC-009 B3890C207 6 - 8	138-STC-010 B3890C207 10 - 11.2	138-STC-011 B3890C207 11.5 - 13.5
Analyte					
AROCLOR-1016	91 U	130 U	94 U	100 U	92 U
AROCLOR-1221	91 U	130 U	94 U	100 U	92 U
AROCLOR-1232	91 U	130 U	94 U	100 U	92 U
AROCLOR-1242	91 U	130 U	94 U	100 U	92 U
AROCLOR-1248	91 U	130 U	94 U	100 U	92 U
AROCLOR-1254	180 U	250 U	190 U	200 U	180 U
AROCLOR-1260	180 U	250 U	190 U	200 U	180 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-7
(continued)

Page 3 of 4

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-012 B3890C207 13.5 - 15.5	138-STC-013 B3890C207 15.5 - 16.5	138-STC-014 B3890C208 0 - 2	138-STC-015 B3890C208 2 - 4	138-STC-016 B3890C208 4 - 6	138-STC-017 B3890C208 6 - 8
Analyte						
AROCLOR-1016	49 U	44 U	93 U	110 U	120 U	94 U
AROCLOR-1221	49 U	44 U	93 U	110 U	120 U	94 U
AROCLOR-1232	49 U	44 U	93 U	110 U	120 U	94 U
AROCLOR-1242	49 U	44 U	93 U	110 U	120 U	94 U
AROCLOR-1248	49 U	44 U	93 U	110 U	120 U	94 U
AROCLOR-1254	97 U	88 U	190 U	220 U	240 U	190 U
AROCLOR-1260	97 U	88 U	190 U	220 U	240 U	190 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-7
(continued)

Page 4 of 4

Sample ID No.	138-STC-036	138-STC-037	138-STC-038	138-STC-039		
Borehole ID No.	B3890C255	B3890C255	B3890C255	B3890C255		
Sample Depth (ft)	0 - 2	4 - 6	12 - 14	17 - 20.5		
Analyte						
AROCLOR-1016	46 U	52 U	52 U	41 U	41 U	41 U
AROCLOR-1221	46 U	52 U	52 U	41 U	41 U	41 U
AROCLOR-1232	46 U	52 U	52 U	41 U	41 U	41 U
AROCLOR-1242	46 U	52 U	52 U	41 U	41 U	41 U
AROCLOR-1248	46 U	52 U	52 U	41 U	41 U	41 U
AROCLOR-1254	91 U	100 U	100 U	82 U	82 U	82 U
AROCLOR-1260	91 U	100 U	100 U	82 U	82 U	82 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-8
Pesticides/PCBs,
Stepan Property Soil Samples

Page 1 of 2

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-008 B3890C207 0 - 2	138-STC-054 B3890C298 14 - 16	138-STC-060 B3890C299 0 - 2	138-STC-061 B3890C299 2 - 4
Analyte				
4,4'-DDD	180 U	160 U	190 U	190 U
4,4'-DDE	180 U	160 U	190 U	190 U
4,4'-DDT	180 U	160 U	190 U	190 U
ALDRIN	90 U	81 U	94 U	95 U
ALPHA CHLORDANE	900 U			
ALPHA-BHC	90 U	81 U	94 U	95 U
AROCLOR-1016	900 U	810 U	940 U	950 U
AROCLOR-1221	900 U	810 U	940 U	950 U
AROCLOR-1232	900 U	810 U	940 U	950 U
AROCLOR-1242	900 U	810 U	940 U	950 U
AROCLOR-1248	900 U	810 U	940 U	950 U
AROCLOR-1254	1800 U	1600 U	1900 U	1900 U
AROCLOR-1260	1800 U	1600 U	1900 U	1900 U
BETA-BHC	90 U	81 U	94 U	95 U
DELTA-BHC	90 U	81 U	94 U	95 U
DIELDRIN	180 U	160 U	190 U	190 U
ENDOSULFAN I	90 U	81 U	94 U	95 U
ENDOSULFAN II	180 U	160 U	190 U	190 U
ENDOSULFAN SULFATE	180 U	160 U	190 U	190 U
ENDRIN	180 U	160 U	190 U	190 U
ENDRIN ALDEHYDE	180 U	200 U	230 U	240 U
ENDRIN KETONE	180 U	160 U	190 U	190 U
GAMMA CHLORDANE	900 U	810 U	940 U	950 U
GAMMA-BHC (LINDANE)	90 U	81 U	94 U	95 U
HEPTACHLOR	90 U	81 U	94 U	95 U
HEPTACHLOR EPOXIDE	90 U	81 U	94 U	95 U
METHOXYCHLOR	900 U	810 U	940 U	950 U
TOXAPHENE	1800 U	1600 U	1900 U	1900 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-8
(continued)

Page 2 of 2

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-063RAD B3890C299 6 - 8	138-STC-064 B3890C299 8 - 10	138-STC-065 B3890C701 0 - 2	138-STC-066 B3890C701 2 - 4	138-STC-068 B3890C701 6 - 8	138-STC-069 B3890C701 8 - 10
Analyte						
4,4'-DDD	210 U	170 U	43 U	230 U	410 U	360 U
4,4'-DDE	210 U	170 U	43 U	230 U	410 U	360 U
4,4'-DDT	210 U	170 U	43 U	230 U	410 U	360 U
ALDRIN	100 U	87 U	21 U	110 U	210 U	180 U
ALPHA CHLORDANE						
ALPHA-BHC	100 U	87 U	21 U	110 U	210 U	180 U
AROCLOR-1016	1000 U	870 U	210 U	1100 U	2100 U	1800 U
AROCLOR-1221	1000 U	870 U	210 U	1100 U	2100 U	1800 U
AROCLOR-1232	1000 U	870 U	210 U	1100 U	2100 U	1800 U
AROCLOR-1242	1000 U	870 U	210 U	1100 U	2100 U	1800 U
AROCLOR-1248	1000 U	870 U	210 U	1100 U	2100 U	1800 U
AROCLOR-1254	2100 U	1700 U	430 U	2300 U	4100 U	3600 U
AROCLOR-1260	2100 U	1700 U	430 U	2300 U	4100 U	3600 U
BETA-BHC	100 U	87 U	21 U	110 U	210 U	180 U
DELTA-BHC	100 U	87 U	21 U	110 U	210 U	180 U
DIELDRIN	210 U	170 U	430 U	230 U	410 U	360 U
ENDOSULFAN I	100 U	87 U	21 U	110 U	210 U	180 U
ENDOSULFAN II	210 U	170 U	43 U	230 U	410 U	360 U
ENDOSULFAN SULFATE	210 U	170 U	43 U	230 U	410 U	360 U
ENDRIN	210 U	170 U	43 U	230 U	410 U	360 U
ENDRIN ALDEHYDE	260 U	220 U	53 U	290 U	520 U	450 U
ENDRIN KETONE	210 U	170 U	43 U	230 U	410 U	360 U
GAMMA CHLORDANE	1000 U	870 U	210 U	1100 U	2100 U	1800 U
GAMMA-BHC (LINDANE)	100 U	87 U	21 U	110 U	210 U	180 U
HEPTACHLOR	100 U	87 U	21 U	110 U	210 U	180 U
HEPTACHLOR EPOXIDE	100 U	87 U	21 U	110 U	210 U	180 U
METHOXYCHLOR	1000 U	870 U	210 U	1100 U	2100 U	1800 U
TOXAPHENE	2100 U	1700 U	430 U	2300 U	4100 U	3600 U

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-9
Total Petroleum Hydrocarbons,
Stepan Property Soil Samples

Sample ID No.	Borehole ID No.	Sample Depth (ft)	Concentration (mg/kg)	Flag
138-STC-018	B3890C217	0-2	47	=
138-STC-019	B3890C217	2-4	8	B
138-STC-020	B3890C217	4-6	8.7	B
138-STC-021	B3890C217	6-8	11	B
138-STC-022	B3890C218	0-2	41	=
138-STC-023	B3890C218	2-4	60	=
138-STC-024	B3890C218	4-6	94	=
138-STC-025	B3890C218	6-8	140	=
138-STC-008	B3890C207	0-2	1600	=
138-STC-009	B3890C207	6-8	240	=
138-STC-010	B3890C207	10-11.2	170	=
138-STC-011	B3890C207	11.5-13.5	7.3	=
138-STC-012	B3890C207	13.5-15.5	36	=
138-STC-013	B3890C207	15.5-16.5	16	=
138-STC-014	B3890C208	0-2	230	=
138-STC-015	B3890C208	2-4	770	=
138-STC-016	B3890C208	4-6	290	=
138-STC-017	B3890C208	6-8	8.5	=
138-STC-036	B3890C255	0-2	60	=
138-STC-037	B3890C255	4-6	9.4	=
138-STC-038	B3890C255	12-14	11	=
138-STC-039	B3890C255	17-20.2	5.4	=
138-STC-045	B3890C296	0-2	9800	=
138-STC-046	B3890C296	4-6	240	=
138-STC-047	B3890C296	8-10	80	=
138-STC-048	B3890C297	0-2	600	=
138-STC-049	B3890C297	2-4	130	=
138-STC-050	B3890C297	4-6	41	=
138-STC-051	B3890C298	0-2	620	=
138-STC-052	B3890C298	2-4	980	=
138-STC-053	B3890C298	4-6	100	=

Concentration Units - mg/kg - milligrams per kilogram.

B - Analyte found in associated blank.

= - No data qualifier required.

Table C-10
TCLP Metals, Stepan Property
Soil Samples

Page 1 of 6

Sample ID No.	138-STC-018	138-STC-019	138-STC-020	138-STC-021	138-STC-022	138-STC-023		
Borehole ID No.	B3890C217	B3890C217	B3890C217	B3890C217	B3890C218	B3890C218		
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4		
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	611	=	279	=	570	=	625	=
Cadmium, TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U
Chromium, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U
Copper, TCLP Leachate	500	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.25	U	0.25	U	0.25	U	0.25	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table C-10
(continued)

Page 2 of 6

Sample ID No.	138-STC-024	138-STC-025	138-STC-008	138-STC-009	138-STC-010	138-STC-011		
Borehole ID No.	B3890C218	B3890C218	B3890C207	B3890C207	B3890C207	B3890C207		
Sample Depth (ft)	4 - 6	6 - 8	0 - 2	6 - 8	10 - 11.2	11.5 - 13.5		
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	200	U	200	U	211	=	246	=
Cadmium, TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U
Chromium, TCLP Leachate	24.6	=	10.0	U	10.0	U	10.0	U
Lead, TCLP Leachate	500	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.25	U	0.25	U	0.25	U	0.25	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table C-10
(continued)

Page 3 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-012 B3890C207 13.5 - 15.5	138-STC-013 B3890C207 15.5 - 16.5	138-STC-014 B3890C208 0 - 2	138-STC-015 B3890C208 2 - 4	138-STC-016 B3890C208 4 - 6	138-STC-017 B3890C208 6 - 8
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	200 U	290 =	401 =	314 =	200 U	834 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	30.8 =	18.7 =	10.0 U	10.0 U	10.0 U	10.0 U
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	18.3 =	20.8 =

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.

Table C-10
(continued)

Page 4 of 6

Sample ID No.	138-STC-045	138-STC-046	138-STC-047	138-STC-048	138-STC-049	138-STC-050
Borehole ID No.	B3890C296	B3890C296	B3890C296	B3890C297	B3890C297	B3890C297
Sample Depth (ft)	0 - 2	4 - 6	8 - 10	0 - 2	2 - 4	4 - 6
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	534 =	344 =	657 =	859 =	200 U	200 U
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.1 =	5.0 U	5.0 U
Chromium, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Lead, TCLP Leachate	90.0 U	90.0 U	90.0 U	90.0 U	90.0 U	90.0 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table C-10
(continued)

Page 5 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-051 B3890C298 0 - 2	138-STC-052 B3890C298 2 - 4	138-STC-053 B3890C298 4 - 6	138-STC-054 B3890C298 14 - 16	138-STC-060 B3890C299 0 - 2	138-STC-061 B3890C299 2 - 4
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	499 =	485 =	200 U	342 =	778 =	342 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.7 =	5.0 U	13.5 =	5.0 U
Chromium, TCLP Leachate	10.0 U	10.0 U	10.0 U	72.2 =	14.3 =	10.0 U
Lead, TCLP Leachate	90.0 U	90.0 U	90.0 U	90.0 U	524 =	90.0 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.

Table C-10
(continued)

Page 6 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-063 B3890C299 6 - 8	138-STC-064 B3890C299 8 - 10	138-STC-065 B3890C701 0 - 2	138-STC-066 B3890C701 2 - 4	138-STC-068 B3890C701 6 - 8	138-STC-069 B3890C701 8 - 10
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	1020 =	1050 =	600 =	596 =	1420 =	1830 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	18.8 =	5.0 U	5.1 =	5.0 U
Chromium, TCLP Leachate	10.0 U	10.0 U	16.2 =	10.0 U	12.2 =	10.0 U
Lead, TCLP Leachate	90.0 U	90.0 U	90.0 U	90.0 U	90.0 U	90.0 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.

Table C-11
TCLP Volatile Organic Compounds, Stepan Property
Soil Samples

Page 1 of 6

Sample ID No.	138-STC-018	138-STC-019	138-STC-020	138-STC-021	138-STC-022	138-STC-023
Borehole ID No.	B3890C217	B3890C217	B3890C217	B3890C217	B3890C218	B3890C218
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4
Analyte						
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	10 J	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
TETRACHLOROETHYLENE	50 U	50 U	16 J	50 U	50 U	50 U
TRICHLOROETHYLENE	50 U	50 U	30 J	50 U	50 U	50 U
VINYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

J - Analyte present; reported as an estimated value.

Table C-11
(continued)

Page 2 of 6

Sample ID No.	138-STC-024	138-STC-025	138-STC-008	138-STC-009	138-STC-010	138-STC-011		
Borehole ID No.	B3890C218	B3890C218	B3890C207	B3890C207	B3890C207	B3890C207		
Sample Depth (ft)	4 - 6	6 - 8	0 - 2	6 - 8	10 - 11.2	11.5 - 13.5		
Analyte								
1,1-DICHLOROETHYLENE	50	U	50	U	50	U	50	U
1,2-DICHLOROETHANE	50	U	50	U	50	U	50	U
2-BUTANONE	100	U	100	U	100	U	100	U
BENZENE	50	U	50	U	50	U	50	U
CARBON TETRACHLORIDE	50	U	50	U	50	U	50	U
CHLOROBENZENE	50	U	50	U	50	U	50	U
CHLOROFORM	50	U	50	U	50	U	50	U
TETRACHLOROETHYLENE	50	U	50	U	76	=	50	U
TRICHLOROETHYLENE	50	U	50	U	61	=	50	U
VINYL CHLORIDE	100	U	100	U	100	U	100	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

J - Analyte present; reported as an estimated value.

Table C-11
(continued)

Page 3 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-012 B3890C207 13.5 - 15.5	138-STC-013 B3890C207 15.5 - 16.5	138-STC-014 B3890C208 0 - 2	138-STC-015 B3890C208 2 - 4	138-STC-016 B3890C208 4 - 6	138-STC-017 B3890C208 6 - 8
Analyte						
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	190 =	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
TETRACHLOROETHYLENE	310 =	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHYLENE	350 =	50 U	50 U	50 U	50 U	50 U
VINYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- = - No data qualifier required.
- J - Analyte present; reported as an estimated value.

Table C-11
(continued)

Page 4 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-045 B3890C296 0 - 2	138-STC-046 B3890C296 4 - 6	138-STC-047 B3890C296 8 - 10	138-STC-048 B3890C297 0 - 2	138-STC-049 B3890C297 2 - 4	138-STC-050 B3890C297 4 - 6
Analyte						
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
TETRACHLOROETHYLENE	16 J	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	13 J
VINYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	50 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- = - No data qualifier required.
- J - Analyte present; reported as an estimated value.

Table C-11
(continued)

Page 5 of 6

Sample ID No.	138-STC-051	138-STC-052	138-STC-053	138-STC-054	138-STC-060	138-STC-061
Borehole ID No.	B3890C298	B3890C298	B3890C298	B3890C298	B3890C299	B3890C299
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	14 - 16	0 - 2	2 - 4
Analyte						
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
TETRACHLOROETHYLENE	50 U	50 U	12 J	50 U	50 U	50 U
TRICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
VINYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

J - Analyte present; reported as an estimated value.

Table C-11
(continued)

Page 6 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-063 B3890C299 6 - 8	138-STC-064 B3890C299 8 - 10	138-STC-065 B3890C701 0 - 2	138-STC-066 B3890C701 2 - 4	138-STC-068 B3890C701 6 - 8	138-STC-069 B3890C701 8 - 10
Analyte						
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
TETRACHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
VINYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

J - Analyte present; reported as an estimated value.

Table C-12
TCLP BNAEs, Stepan Property
Soil Samples

Page 1 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-018 B3890C217 0 - 2	138-STC-019 B3890C217 2 - 4	138-STC-020 B3890C217 4 - 6	138-STC-021 B3890C217 6 - 8	138-STC-022 B3890C218 0 - 2	138-STC-023 B3890C218 2 - 4
Analyte						
1,4-DICHLOROBENZENE	55 U	70 U	130 U	110 U	110 U	120 U
2,4,5-TRICHLOROPHENOL	280 U	350 U	650 U	550 U	550 U	600 U
2,4,6-TRICHLOROPHENOL	55 U	70 U	130 U	110 U	110 U	120 U
2,4-DINITROTOLUENE	55 U	70 U	130 U	110 U	110 U	120 U
2-METHYLPHENOL	55 U	70 U	130 U	110 U	110 U	120 U
4-METHYLPHENOL	55 U	70 U	130 U	110 U	110 U	120 U
HEXACHLOROBENZENE	55 U	70 U	130 U	110 U	110 U	120 U
HEXACHLOROBUTADIENE	55 U	70 U	130 U	110 U	110 U	120 U
HEXACHLOROETHANE	55 U	70 U	130 U	110 U	110 U	120 U
NITROBENZENE	55 U	70 U	130 U	110 U	110 U	120 U
PENTACHLOROPHENOL	280 U	350 U	650 U	550 U	550 U	600 U
PYRIDINE	55 U	70 U	130 U	110 U	110 U	120 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

Table C-12
(continued)

page 2 of 6

Sample ID No. Corehole ID No. Sample Depth (ft)	138-STC-024 B3890C218 4 - 6	138-STC-025 B3890C218 6 - 8	138-STC-008 B3890C207 0 - 2	138-STC-009 B3890C207 6 - 8	138-STC-010 B3890C207 10 - 11.2	138-STC-011 B3890C207 11.5 - 13.5
Analyte						
1,4-DICHLOROBENZENE	110 U	87 U	160 U	180 U	170 U	150 U
1,4,5-TRICHLOROPHENOL	550 U	440 U	800 U	900 U	850 U	16 J
1,4,6-TRICHLOROPHENOL	110 U	87 U	160 U	180 U	170 U	150 U
1,4-DINITROTOLUENE	110 U	87 U	160 U	180 U	170 U	150 U
2-METHYLPHENOL	110 U	87 U	160 U	180 U	170 U	150 U
3-METHYLPHENOL	110 U	87 U	160 U	180 U	170 U	150 U
1,2-DICHLOROBENZENE	110 U	500 =	160 U	180 U	170 U	150 U
1,2-DICHLOROBUTADIENE	110 U	320 =	160 U	180 U	170 U	150 U
1,2-DICHLOROETHANE	110 U	87 U	160 U	180 U	170 U	150 U
1,2-DICHLOROBENZENE	110 U	87 U	160 U	180 U	170 U	150 U
1,2-DICHLOROPHENOL	550 U	440 U	800 U	900 U	850 U	150 U
1,2-DICHLOROBENZENE	110 U	87 U	160 U	180 U	170 U	150 U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.

Table C-12
(continued)

Page 3 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-012 B3890C207 13.5 - 15.5	138-STC-013 B3890C207 15.5 - 16.5	138-STC-014 B3890C208 0 - 2	138-STC-015 B3890C208 2 - 4	138-STC-016 B3890C208 4 - 6	138-STC-017 B3890C208 6 - 8
Analyte						
1,4-DICHLOROBENZENE	140 U	160 U	160 U	70 U	160 U	70 U
2,4,5-TRICHLOROPHENOL	23 J	800 U	23 J	350 U	800 U	350 U
2,4,6-TRICHLOROPHENOL	140 U	160 U	160 U	70 U	160 U	70 U
2,4-DINITROTOLUENE	140 U	160 U	160 U	70 U	160 U	70 U
2-METHYLPHENOL	140 U	160 U	160 U	70 U	160 U	70 U
4-METHYLPHENOL	140 U	160 U	160 U	70 U	160 U	70 U
HEXACHLOROBENZENE	140 U	160 U	160 U	70 U	160 U	70 U
HEXACHLOROBUTADIENE	140 U	160 U	160 U	70 U	160 U	70 U
HEXACHLOROETHANE	140 U	160 U	160 U	70 U	160 U	70 U
NITROBENZENE	140 U	160 U	160 U	70 U	160 U	70 U
PENTACHLOROPHENOL	700 U	800 U	800 U	350 U	800 U	350 U
PYRIDINE	140 U	160 U	160 U	70 U	160 U	70 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 = - No data qualifier required.

Table C-12
(continued)

Page 4 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-045 B3890C296 0 - 2	138-STC-046 B3890C296 4 - 6	138-STC-047 B3890C296 8 - 10	138-STC-048 B3890C297 0 - 2	138-STC-049 B3890C297 2 - 4	138-STC-050 B3890C297 4 - 6
Analyte						
1,4-DICHLOROBENZENE	55 U	55 U	55 U	55 U	55 U	55 U
2,4,5-TRICHLOROPHENOL	280 U	280 U	280 U	280 U	280 U	280 U
2,4,6-TRICHLOROPHENOL	55 U	55 U	55 U	55 U	55 U	55 U
2,4-DINITROTOLUENE	55 U	55 U	55 U	55 U	55 U	55 U
3-METHYLPHENOL	55 U	55 U	55 U	55 U	55 U	55 U
4-METHYLPHENOL	55 U	55 U	55 U	55 U	55 U	55 U
HEXACHLOROBENZENE	55 U	55 U	55 U	55 U	55 U	55 U
HEXACHLOROBUTADIENE	55 U	55 U	55 U	55 U	55 U	55 U
HEXACHLOROETHANE	55 U	55 U	55 U	55 U	55 U	55 U
NITROBENZENE	55 U	55 U	55 U	55 U	55 U	55 U
PENTACHLOROPHENOL	280 U	280 U	280 U	280 U	280 U	280 U
PYRIDINE	55 U	55 U	55 U	55 U	55 U	55 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.

Table C-12
(continued)

Page 5 of 6

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-051 B3890C298 0 - 2	138-STC-052 B3890C298 2 - 4	138-STC-053 B3890C298 4 - 6	138-STC-054 B3890C298 14 - 16	138-STC-060 B3890C299 0 - 2	138-STC-061 B3890C299 2 - 4
Analyte						
1,4-DICHLOROBENZENE	55 U	60 U	55 U	60 U	60 U	55 U
2,4,5-TRICHLOROPHENOL	280 U	300 U	280 U	300 U	300 U	280 U
2,4,6-TRICHLOROPHENOL	55 U	60 U	55 U	60 U	60 U	55 U
2,4-DINITROTOLUENE	55 U	60 U	55 U	60 U	60 U	55 U
2-METHYLPHENOL	55 U	60 U	55 U	60 U	60 U	55 U
4-METHYLPHENOL	55 U	60 U	55 U	60 U	60 U	55 U
HEXACHLOROBENZENE	55 U	60 U	55 U	60 U	60 U	55 U
HEXACHLOROBUTADIENE	55 U	60 U	55 U	60 U	60 U	55 U
HEXACHLOROETHANE	55 U	60 U	55 U	60 U	60 U	55 U
NITROBENZENE	55 U	60 U	55 U	60 U	60 U	55 U
PENTACHLOROPHENOL	280 U	300 U	280 U	300 U	300 U	280 U
PYRIDINE	55 U	60 U	55 U	60 U	60 U	55 U

Concentration Units - µg/L - micrograms per liter.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.

Table C-12
(continued)

Page 6 of 6

Sample ID No.	138-STC-063	138-STC-064	138-STC-065	138-STC-066	138-STC-068	138-STC-069		
Corehole ID No.	B3890C299	B3890C299	B3890C701	B3890C701	B3890C701	B3890C701		
Sample Depth (ft)	6 - 8	8 - 10	0 - 2	2 - 4	6 - 8	8 - 10		
Analyte								
1,4-DICHLOROBENZENE	60	U	60	U	60	U	55	U
1,4,5-TRICHLOROPHENOL	300	U	300	U	300	U	280	U
1,4,6-TRICHLOROPHENOL	60	U	60	U	60	U	55	U
1,4-DINITROTOLUENE	60	U	60	U	60	U	55	U
1-METHYLPHENOL	60	U	60	U	60	U	55	U
2-METHYLPHENOL	60	U	60	U	60	U	55	U
1,2-DICHLOROBENZENE	60	U	60	U	60	U	55	U
1,2-DICHLOROBUTADIENE	60	U	60	U	60	U	55	U
1,1-DICHLOROETHANE	60	U	60	U	60	U	55	U
1,2-DIBROMOBENZENE	60	U	60	U	60	U	55	U
1,2,4-TRICHLOROPHENOL	300	U	300	U	300	U	280	U
1,2,4-TRICHLOROBENZENE	60	U	60	U	60	U	55	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.

Table C-13
TCLP Pesticides, Stepan Property
Soil Samples

Page 1 of 5

Sample ID No.	138-STC-018	138-STC-019	138-STC-020	138-STC-021	138-STC-022	138-STC-023						
Corehole ID No.	B3890C217	B3890C217	B3890C217	B3890C217	B3890C218	B3890C218						
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4						
Analyte												
LPHA CHLORDANE	1.0	U	1.1	U	1.0	U	1.3	U	1.2	U	0.50	U
DDRIN	0.21	U	0.21	U	0.21	U	0.26	U	0.24	U	0.10	U
AMMA CHLORDANE	1.0	U	1.1	U	1.0	U	1.3	U	1.2	U	0.50	U
AMMA-BHC (LINDANE)	0.10	U	0.11	U	0.10	U	0.13	U	0.12	U	0.050	U
EPTACHLOR	0.10	U	0.11	U	0.10	U	0.13	U	0.12	U	0.050	U
ETHOXYCHLOR	1.0	U	1.1	U	1.0	U	1.3	U	1.2	U	0.50	U
DXAPHENE	2.1	U	2.1	U	2.1	U	2.6	U	2.4	U	1.0	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-13
(continued)

Page 2 of 5

Sample ID No.	138-STC-024	138-STC-025	138-STC-008	138-STC-009	138-STC-010	138-STC-011
Borehole ID No.	B3890C218	B3890C218	B3890C207	B3890C207	B3890C207	B3890C207
Sample Depth (ft)	4 - 6	6 - 8	0 - 2	6 - 8	10 - 11.2	11.5 - 13.5
Analyte						
ALPHA CHLORDANE	1.1 U	1.3 U	1.5 U	1.4 U	1.2 U	1.2 U
DELTA CHLORDANE	0.22 U	0.26 U	0.29 U	0.28 U	0.24 U	0.25 U
GAMMA CHLORDANE	1.1 U	1.3 U	1.5 U	1.4 U	1.2 U	1.2 U
GAMMA-BHC (LINDANE)	0.11 U	0.13 U	0.15 U	0.14 U	0.12 U	0.12 U
HEPTACHLOR	0.11 U	0.13 U	0.15 U	0.14 U	0.12 U	0.12 U
HEPTACHLOR EPOXIDE	1.1 U	1.3 U	1.5 U	1.4 U	1.2 U	1.2 U
NONACHLOR	2.2 U	2.6 U	2.9 U	2.8 U	2.4 U	2.5 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-13
(continued)

Page 3 of 5

Sample ID No.	138-STC-012	138-STC-013	138-STC-014	138-STC-015	138-STC-016	138-STC-017		
Drillhole ID No.	B3890C207	B3890C207	B3890C208	B3890C208	B3890C208	B3890C208		
Sample Depth (ft)	13.5 - 15.5	15.5 - 16.5	0 - 2	2 - 4	4 - 6	6 - 8		
Analyte								
PHA CHLORDANE	1.4	U	1.3	U	1.4	U	1.5	U
DRIN	0.28	U	0.26	U	0.28	U	0.29	U
MMA CHLORDANE	1.4	U	1.3	U	1.4	U	1.5	U
MMA-BHC (LINDANE)	0.14	U	0.13	U	0.14	U	0.15	U
PTACHLOR	0.14	U	0.13	U	0.13	U	0.14	U
THOXYCHLOR	1.4	U	1.3	U	1.3	U	1.4	U
XAPHENE	2.8	U	2.6	U	2.6	U	2.8	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-13
(continued)

Page 4 of 5

Sample ID No.	138-STC-054	138-STC-060	138-STC-061	138-STC-063	138-STC-064	138-STC-065
Well ID No.	B3890C298	B3890C299	B3890C299	B3890C299	B3890C299	B3890C701
Sample Depth (ft)	14 - 16	0 - 2	2 - 4	6 - 8	8 - 10	0 - 2
Analyte						
PHA CHLORDANE	1.1 U	1.1 U	6.2 U	5.6 U	5.6 U	5.2 U
DRIN	0.22 U	0.23 U	1.2 U	1.1 U	1.1 U	1.0 U
MMA CHLORDANE	1.1 U	1.1 U	6.2 U	5.6 U	5.6 U	5.2 U
MMA-BHC (LINDANE)	0.11 U	0.11 U	0.62 U	0.56 U	0.56 U	0.52 U
PTACHLOR	0.11 U	0.11 U	0.62 U	0.56 U	0.56 U	0.52 U
THOXYCHLOR	1.1 U	1.1 U	6.2 U	5.6 U	5.6 U	5.2 U
XAPHENE	2.2 U	2.3 U	12 U	11 U	11 U	10 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-13
(continued)

Page 5 of 5

Sample ID No.	138-STC-066		138-STC-068		138-STC-069	
Borehole ID No.	B3890C701		B3890C701		B3890C701	
Sample Depth (ft)	2 - 4		6 - 8		8 - 10	
Analyte						
ALPHA CHLORDANE	5.7	U	5.6	U	5.6	U
ENDRIN	1.1	U	1.1	U	1.1	U
GAMMA CHLORDANE	5.7	U	5.6	U	5.6	U
GAMMA-BHC (LINDANE)	0.57	U	0.56	U	0.56	U
HEPTACHLOR	0.57	U	0.56	U	0.56	U
METHOXYCHLOR	5.7	U	5.6	U	5.6	U
TOXAPHENE	11	U	11	U	11	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table C-14
TCLP Herbicides, Stepan Property
Soil Samples

Page 1 of 5

Sample ID No.	138-STC-008	138-STC-009	138-STC-010	138-STC-011	138-STC-012	138-STC-013
Well ID No.	B3890C207	B3890C207	B3890C207	B3890C207	B3890C207	B3890C207
Sample Depth (ft)	0 - 2	6 - 8	10 - 11.2	11.5 - 13.5	13.5 - 15.5	15.5 - 16.5
Analyte						
2,4-D	1.3 U	1.4 U	1.3 U	1.2 U	1.4 U	1.3 U
2,4,5-TP (SILVEX)	2.6 U	2.8 U	2.6 U	2.4 U	2.7 U	2.6 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum detection limit for the sample is reported.
 Analyte present; reported as an estimated value.

Table C-14
(continued)

2 of 5

Well ID No. hole ID No. Well Depth (ft)	138-STC-014 B3890C208 0 - 2	138-STC-015 B3890C208 2 - 4	138-STC-016 B3890C208 4 - 6	138-STC-017 B3890C208 6 - 8	138-STC-045 B3890C296 0 - 2	138-STC-046 B3890C296 4 - 6
Analyte						
5-TP (SILVEX)	1.4 U	1.2 U	1.4 U	1.2 U	1.2 U	1.2 U
D	2.7 U	2.4 U	2.8 U	2.4 U	0.65 J	2.4 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum detection limit for the sample is reported.
Analyte present; reported as an estimated value.

Table C-14
(continued)

Page 3 of 5

Sample ID No.	138-STC-047	138-STC-048	138-STC-049	138-STC-050	138-STC-051	138-STC-052
Borehole ID No.	B3890C296	B3890C297	B3890C297	B3890C297	B3890C298	B3890C298
Sample Depth (ft)	8 - 10	0 - 2	2 - 4	4 - 6	0 - 2	2 - 4
Analyte						
2,4,5-TP (SILVEX)	1.2 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
2,4-D	2.5 U	2.2 U	2.3 U	2.1 U	2.1 U	2.2 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

J - Analyte present; reported as an estimated value.

Table C-14
(continued)

Page 4 of 5

Sample ID No.	138-STC-053	138-STC-054	138-STC-060	138-STC-061	138-STC-063	138-STC-064
Borehole ID No.	B3890C298	B3890C298	B3890C299	B3890C299	B3890C299	B3890C299
Sample Depth (ft)	4 - 6	14 - 16	0 - 2	2 - 4	6 - 8	8 - 10
Analyte						
2,4,5-TP (SILVEX)	1.2 U	1.2 U	1.2 U	1.3 U	1.1 U	1.3 U
2,4-D	2.4 U	2.3 U	2.4 U	2.6 U	2.2 U	2.6 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

J - Analyte present; reported as an estimated value.

Table C-14
(continued)

Page 5 of 5

Sample ID No.	138-STC-065	138-STC-066	138-STC-068	138-STC-069
Borehole ID No.	B3890C701	B3890C701	B3890C701	B3890C701
Sample Depth (ft)	0 - 2	2 - 4	6 - 8	8 - 10
Analyte				
2,4,5-TP (SILVEX)	1.1 U	1.1 U	1.3 U	1.2 U
2,4-D	2.3 U	2.2 U	2.6 U	2.5 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

J - Analyte present; reported as an estimated value.

Table C-15
Corrosivity/Reactivity, Stepan Property
Soil Samples

Page 1 of 7

Sample ID No.	138-STC-018	138-STC-019	138-STC-020	138-STC-021	138-STC-022	138-STC-023
Borehole ID No.	B3890C217	B3890C217	B3890C217	B3890C217	B3890C218	B3890C218
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4
Analyte						
Corrosivity by pH	6.9 =	6.5 =	6.5 =	6.5 =	6.4 =	8.1 =
Cyanide, Total	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U
Sulfide	0.28 U	0.27 U	0.30 U	0.28 U	0.27 U	0.27 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table C-15
(continued)

Page 2 of 7

Sample ID No.	138-STC-024	138-STC-025	138-STC-008	138-STC-009	138-STC-010	138-STC-011
Borehole ID No.	B3890C218	B3890C218	B3890C207	B3890C207	B3890C207	B3890C207
Sample Depth (ft)	4 - 6	6 - 8	0 - 2	6 - 8	10 - 11.2	11.5 - 13.5
Analyte						
Corrosivity by pH	7.7 =	7.6 =	7.5 =	8.8 =	7.3 =	7.3 =
Cyanide, Total	1.2 U	1.6 U	1.2 U	1.2 U	1.3 U	1.2 U
Sulfide	0.29 U	0.40 U	0.29 U	0.29 U	0.32 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table C-15
(continued)

Page 3 of 7

Sample ID No.	138-STC-012	138-STC-013	138-STC-014	138-STC-015	138-STC-016	138-STC-017
Borehole ID No.	B3890C207	B3890C207	B3890C208	B3890C208	B3890C208	B3890C208
Sample Depth (ft)	13.5 - 15.5	15.5 - 16.5	0 - 2	2 - 4	4 - 6	6 - 8
Analyte						
Corrosivity by pH	8.2 =	7.2 =	7.3 =	7.1 =	6.2 =	6.7 =
Cyanide, Total	1.2 U	1.1 U	1.2 U	1.4 U	1.5 U	1.2 U
Sulfide	0.31 U	0.28 U	0.30 U	0.36 U	0.38 U	0.30 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table C-15
(continued)

Page 4 of 7

Sample ID No.	138-STC-036	138-STC-037	138-STC-038	138-STC-039	138-STC-045	138-STC-046
Borehole ID No.	B3890C255	B3890C255	B3890C255	B3890C255	B3890C296	B3890C296
Sample Depth (ft)	0 - 2	4 - 6	12 - 14	17 - 20.2	0 - 2	4 - 6
Analyte						
Corrosivity by pH	6.7 =	7.2 =	7.4 =	8.0 =	7.0 =	5.6 =
Cyanide, Total	NR	NR	NR	NR	0.56 U	0.54 U
Sulfide	NR	NR	NR	NR	0.28 U	0.27 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- = - No data qualifier required.
- NR - Analysis not requested.

Table C-15
(continued)

Page 5 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-047 B3890C296 8 - 10	138-STC-048 B3890C297 0 - 2	138-STC-049 B3890C297 2 - 4	138-STC-050 B3890C297 4 - 6	138-STC-051 B3890C298 0 - 2	138-STC-052 B3890C298 2 - 4
Analyte						
Corrosivity by pH	6.0 =	7.1 =	6.8 =	6.8 =	6.8 =	7.8 =
Cyanide, Total	0.55 U	0.55 U	0.53 U	0.66 U	0.54 U	0.57 U
Sulfide	0.28 U	0.28 U	0.29 U	0.33 U	0.27 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table C-15
(continued)

Page 6 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-053 B3890C298 4 - 6	138-STC-054 B3890C298 14 - 16	138-STC-060 B3890C299 0 - 2	138-STC-061 B3890C299 2 - 4	138-STC-063 B3890C299 6 - 8	138-STC-064 B3890C299 8 - 10
Analyte						
Corrosivity by pH	7.1 =	7.3 =	7.4 =	7.8 =	8.4 =	8.8 =
Cyanide, Total	0.64 U	0.68 U	0.59 U	0.58 U	0.57 U	0.57 U
Sulfide	0.32 U	0.26 U	0.30 U	0.29 U	0.28 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table C-15
(continued)

Page 7 of 7

Sample ID No.	138-STC-065	138-STC-066	138-STC-068	138-STC-069
Borehole ID No.	B3890C701	B3890C701	B3890C701	B3890C701
Sample Depth (ft)	0 - 2	2 - 4	6 - 8	8 - 10
Analyte				
Corrosivity by pH	7.6 =	8.1 =	7.7 =	9.8 =
Cyanide, Total	0.59 U	0.62 U	0.58 U	0.59 U
Sulfide	0.29 U	0.31 U	0.29 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table C-16
Mobile Ions,
Stepan Property

Page 1 of 8

Sample ID No.	138-STC-018	138-STC-019	138-STC-020	138-STC-021	138-STC-022	138-STC-023
Borehole ID No.	B3890C217	B3890C217	B3890C217	B3890C217	B3890C218	B3890C218
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4
Analyte						
Total Solids	88.8 =	93.4 =	83.1 =	90.6 =	91.6 =	92.1 =
Chloride ^a	56.3 U	53.6 U	60.1 U	55.2 U	54.6 U	54.3 U
Nitrate, as N ^a	2.7 =	1.1 U	2.3 =	2.1 =	5.6 =	33.9 =
Phosphate, as P ^a	660 =	277 =	298 =	111 =	148 =	3560 =

- Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table C-16
(continued)

Page 2 of 8

Sample ID No.	138-STC-024	138-STC-025	138-STC-008	138-STC-009
Borehole ID No.	B3890C218	B3890C218	B3890C207	B3890C207
Sample Depth (ft)	4 - 6	6 - 8	0 - 2	6 - 8
Analyte				
% Solids	85.7 =	62.2 =	86.8 =	85.1 =
Chloride ^a	58.3 U	80.4 U	57.6 U	58.7 U
Nitrate, as N ^a	2.1 =	1.6 U	2.5 =	10.5 =
Phosphate, as P ^a	7730 =	15400 =	1700 =	2190 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table C-16
(continued)

Page 3 of 8

Sample ID No.	138-STC-010	138-STC-011	138-STC-012	138-STC-013	138-STC-014	138-STC-015
Borehole ID No.	B3890C207	B3890C207	B3890C207	B3890C207	B3890C208	B3890C208
Sample Depth (ft)	10 - 11.2	11.5 - 13.5	13.5 - 15.5	15.5 - 16.5	0 - 2	2 - 4
Analyte						
% Solids	79.1 =	85.8 =	81.2 =	89.6 =	83.5 =	70.3 =
Chloride ^a	63.2 U	58.3 U	57.6 U	55.8 U	59.9 U	71.1 U
Nitrate, as N ^a	2.2 =	1.3 =	1.6 =	2.7 =	4.0 =	3.2 =
Phosphate, as P ^a	871 =	2400 =	2500 =	561 =	1260 =	5530 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table C-16
(continued)

Page 4 of 8

Sample ID No.	138-STC-016	138-STC-017	138-STC-036	138-STC-037	138-STC-038
Borehole ID No.	B3890C208	B3890C208	B3890C255	B3890C255	B3890C255
Sample Depth (ft)	4 - 6	6 - 8	0 - 2	4 - 6	12 - 14
Analyte					
% Solids	66.3 =	84.1 =	93.8 =	71.4 =	83.1 =
Chloride ^a	147 =	59.5 U	26.7 U	35.0 U	30.1 U
Nitrate, as N ^a	6.2 =	3.5 =	4.6 =	1.4 U	1.2 U
Phosphate, as P ^a	6200 =	1180 =	309 =	13400 =	17700 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table C-16
(continued)

Page 5 of 8

Sample ID No.	138-STC-039		138-STC-045		138-STC-046		138-STC-047		138-STC-048
Borehole ID No.	B3890C255		B3890C296		B3890C296		B3890C296		B3890C297
Sample Depth (ft)	17 - 20.2		0 - 2		4 - 6		8 - 10		0 - 2
Analyte									
% Solids	95.9	=	88.6	=	92.5	=	90.3	=	90.8
Chloride ^a	26.1	U	56.4	U	54.1	U	55.4	U	55.1
Nitrate, as N ^a	4.2	=	1.3	U	1.2	U	1.2	U	4.8
Phosphate, as P ^a	392	=	472	=	288	=	270	=	504

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table C-16
(continued)

Page 6 of 8

Sample ID No. Borehole ID No. Sample Depth (ft)	138-STC-049 B3890C297 2 - 4	138-STC-050 B3890C297 4 - 6	138-STC-051 B3890C298 0 - 2	138-STC-052 B3890C298 2 - 4	138-STC-053 B3890C298 4 - 6	138-STC-054 B3890C298 14 - 16
Analyte						
% Solids	85.2 =	75.0 =	61.1 =	86.9 =	77.8 =	94.6 =
Chloride ^a	58.7 U	66.7 U	81.9 U	57.5 U	64.3 U	52.8 U
Nitrate, as N ^a	1.2 U	1.3 U	1.6 U	1.2 U	1.3 U	1.1 U
Phosphate, as P ^a	3200 =	15100 =	625 =	1960 =	8150 =	458 =

¹ - Concentration Units - mg/kg - milligrams per kilogram.

J - The analyte was not detected. The minimum detection limit for the sample is reported.

* - No data qualifier required.

Table C-16
(continued)

Page 7 of 8

Sample ID No.	138-STC-060	138-STC-061	138-STC-063	138-STC-064	138-STC-065
Borehole ID No.	B3890C299	B3890C299	B3890C299	B3890C299	B3890C701
Sample Depth (ft)	0 - 2	2 - 4	6 - 8	8 - 10	0 - 2
Analyte					
% Solids	84.5 =	85.5 =	88.4 =	87.7 =	85.4 =
Chloride ^a	59.2 U	58.5 U	56.6 U	57.0 U	58.6 U
Nitrate, as N ^a	1.5 =	6.7 =	1.1 U	1.5 =	2.1 =
Phosphate, as P ^a	1490 =	1360 =	445 =	409 =	1270 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table C-16
(continued)

Page 8 of 8

Sample ID No.	138-STC-066		138-STC-068		138-STC-069
Borehole ID No.	B3890C701		B3890C701		B3890C701
Sample Depth (ft)	0 - 2		6 - 8		8 - 10
Analyte					
% Solids	81.0	=	86.6	=	85.1
Chloride ^a	61.7	U	57.7	U	58.8
Nitrate, as N ^a	5.8	=	2.1	=	1.4
Phosphate, as P ^a	964	=	411	=	423

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Geologic Logs



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R101
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Stepan Property			N 9700.0; E 10005.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
9-18-90	9-18-90	Hydro Group, Inc.	Mobile B-80	8"	12.0	2.5	14.5			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
10.9/75*		0	8	NA	57.0	NA / NA		12.0/45.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	2.0	6 12 16 50				57.0				0.0 - 6.7 ft: FILL.	Complete borehole number is B3890R101. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	12 14 10 3				53.7				0.0 - 3.3 ft: Gravelly Sand to Silty Sand, Grayish brown (5YR3/2) changing to Dark reddish brown (10R3/4) at 1.0', to Light brown (5YR5/6) at 2.0' and to Grayish black at 2.7'; Varying amounts of gravel; sandstone fragment, Very light gray (N8), between 3.0 - 3.3'.	
SS	2.0	0.9	9 18 21 5				53.0				4.0 - 6.7 ft: Brick fragments with wood and coarse sand, Dark gray (N3) changing to Grayish black (N2) at 6.0'; with gravel between 6.0 - 6.7'.	
SS	2.0	1.1	6 6 9 12				52.1	5			6.7 - 8.2 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), with some gravel, moist.	
SS	2.0	1.2	9 10 12 15				51.0				8.2 - 11.9 ft: Gravelly SAND, (SW); Grayish black (N2) changing to Dark reddish brown (10R3/4) at 8.8', silt content increases with depth, dense.	
SS	2.0	1.9	13 13 18 20				50.3					
SS	2.0	2.0	18 19 30 33				49.9					
SS	2.0	2.0	18 19 30 33				49.0					
SS	2.0	2.0	18 19 30 33				48.8					
SS	0.5	0.5	50/6"				47.8	10			12.0 - 14.5 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), common pebbles up to 1 cm, very dense, moist.	
							47.0					
							45.1					
							45.0					
							42.5					
TOTAL DEPTH = 14.5 FT.											Augered to total depth of 14.5'. 3" PVC casing inserted to 13.5' for gamma-logging.	
TOTAL DEPTH = 14.5 FT.											PVC casing was removed after logging; hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R101
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		ANGLE FROM HORIZ		BEARING					
Stepan Property				N 9600.0; E 10005.0		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
9-19-90	9-19-90	Hydro Group, Inc.	Mobile B-80		8"	2.4	3.4	5.8					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.5/78*		0	3	NA	57.0	V / NA W / NA		2.4/54.6					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.4	8 12 28 26				57.0					(Template: MYWD)	
SS	2.0	1.7	30 20 19 20				55.8 55.0 54.6					0.0 - 2.4 ft: FILL; Sandy Gravel and debris; Light olive gray (5Y3/2) changing to Brownish black (5YR2/1) at 0.4' and to Very dusky red (10R2/2) at 2.0'; color changes occur with increasing silt content, medium to coarse sand; red bricks and cement fragments; slag material, Very light gray (N8), hard between 0.7 - 1.4'; some wood material between 1.2 - 2.4'.	Complete borehole number is B3890R102.
SS	1.8	1.4	15 18 24 50/4"				53.3 53.0					2.4 - 5.4 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), medium sand, moderately sorted, compact, with common pebbles up to 3 cm, moist; sandstone fragment, -7 cm, between 3.0 - 3.2'; weathered sandstone at 5.4'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							51.6 51.2	5				TOTAL DEPTH = 5.8 FT.	Spoon refusal at 5.8'. Augered to total depth of 5.8'. 3" PVC casing inserted to 3.5' for gamma-logging. PVC casing was removed after logging; hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).													
SITE											Last Update:		HOLE NO.
Stepan Property											03-19-92		R102



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R103
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9700.0; E 10100.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
9-19-90	9-19-90	Hydro Group, Inc.	Mobile B-80		8"	7.0	3.0	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.9/59*		0	5	NA	58.0	NA / NA		7.0/51.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	1.8	1.3	10/4* 25 48 43				58.0 57.8		0.0 - 0.2 ft: ASPHALT	Complete borehole number is B3890R103. Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	0.9	8 3 2 4				56.5 56.0 55.1		0.2 - 7.0 ft: FILL. 0.2 - 1.3 ft: Gravelly Sand; Grayish black (N2), coarse, poorly sorted; layer of sands, Very light gray (N8), between 0.7 - 0.9' and 1.0 - 1.3'; dry. 2.0 - 2.5 ft: Slag and debris, Very light gray (N8) to Dark Gray (N3), hard, broken fragments; sand, gravel and glass below 2.2'. 2.5 - 7.0 ft: Sludge; Very light gray (N8) mixed with Dark gray (N3), cottony texture, moist.		
SS	2.0	0.0	3 6 2 3				52.0 51.0				
SS	2.0	2.0	3 4 12 13								
SS	2.0	1.7	14 9 7 7								
							48.3 48.0	10			
TOTAL DEPTH = 10.0 FT.										Augered to total depth of 10.0'. 3" PVC casing inserted to 9.0' for gamma-logging. PVC casing was removed after logging; hole was grouted to -3' below surface and remaining hole backfilled with drilling spoils.	
										* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R103
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R104

SITE

Stepan Property

COORDINATES

N 9500.0; E 10100.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

9-19-90

COMPLETED

9-19-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

3.2

ROCK (FT.)

0.2

TOTAL DEPTH

3.4

CORE RECOVERY (FT./%)

2.9/85*

CORE BOXES

SAMPLES

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

3.2/53.8

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	6 12 19 24					57.0				0.0 - 3.2 ft: FILL ; Silty Gravel and building debris mixed with sand; Grayish black (N2) changing to Dark gray at (N3) at 2.8', gravel content increasing with depth; layer of sand, Very light gray (N8) between 0.7 - 1.0'; moist to wet.	Complete borehole number is B3890R104. Borehole sampled and gamma-logged by TMA/Eberline Corp. Auger refusal at 3.4'. 3" PVC casing inserted to 2.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.
SS	1.4	1.4	29 24 50/5"				55.5 55.0				3.2 - 3.4 ft: SANDSTONE ; Dark reddish brown (10R3/4), medium grained, very hard, moist. TOTAL DEPTH = 3.4 FT.		
							53.8 53.6						

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R104



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R105
SITE Stepan Property			COORDINATES N 9506.0; E 10108.0			ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 9-19-90	COMPLETED 9-19-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 3.2	ROCK (FT.) 0.3	TOTAL DEPTH 3.5	
CORE RECOVERY (FT./%) 0.0/NA		CORE BOXES 0	SAMPLES 2	EL. TOP CASING NA	GROUND EL. 57.0	DEPTH/EL. GROUND WATER NA / NA	DEPTH/EL. TOP OF ROCK 3.2/53.8	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							57.0			0.0 - 3.2 ft: FILL ; Silty Gravel and building debris mixed with sand; Grayish black (N2) changing to Dark gray at (N3) at 2.8', gravel content increasing with depth; layer of sand, Very light gray (N8) between 0.7 - 1.0'; moist to wet.	Complete borehole number is B3890R105. Borehole similar to Hole R104.
							53.8 53.5			3.2 - 3.5 ft: SANDSTONE ; Dark reddish brown (10R3/4), medium grained, very hard, moist. TOTAL DEPTH = 3.5 FT.	Augered directly to refusal at 3.5'. Hole was backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R105
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501	1 OF 1	R106					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
Stepan Property			N 9500.0; E 10000.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)					
9-19-90	9-19-90	Hydro Group, Inc.		Mobile B-80		8"	4.8	1.9					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
3.3/49*		0	4	NA	57.0	NA		4.8/52.2					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140 lbs/30 in			none		Stephen Knuttel <i>[Signature]</i>								
SMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BL. ONS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	0.2	7					57.0				(Template: NYWD)	
			13					56.8				0.0 - 4.8 ft: FILL.	
			7									0.0 - 0.2 ft: Silty Gravel; Dark gray (N3).	Complete borehole number is B3890R106.
SS	2.0	0.6	6					55.0				2.0 - 4.8 ft: Gravelly, Silty Sand; Grayish black (N2), loose, brick fragment between 2.5 - 2.6'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			4					54.4					
			6										
			8										
SS	2.0	1.8	4					53.0				4.8 - 6.7 ft: Silty SAND (SM); Moderate reddish brown (10R4/6), fine to medium sand, moderately sorted, moist; grading to coarse sand and gravel with depth, loose, wet.	
			5					52.2	5				
			4										
			12					51.2					
SS	0.7	0.7	12					51.0					Augered to 6.0'. Spoon refusal at 6.7' 3" PVC casing inserted to 6.0' for gamma-logging.
			50/2"					50.3					PVC casing was removed after logging; hole was grouted to -2' below surface and remaining hole backfilled with drilling spoils.
TOTAL DEPTH = 6.7 FT.													
												* Core recovery refers to total rock & soil sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Stepan Property		Last Update: 03-19-92		HOLE NO. R106			



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R107
SITE Stepan Property			COORDINATES N 9400.0; E 10100.0			ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 9-20-90	COMPLETED 9-20-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 6.0	ROCK (FT.) 0.5	TOTAL DEPTH 6.5	
CORE RECOVERY (FT./%) 4.3/66°		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 56.0	DEPTH/EL. GROUND WATER NA	DEPTH/EL. TOP OF ROCK 6.0/50.0	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. TESTS	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.3	16 20 15 10				56.0				0.0 - 3.3 ft: Sandy GRAVEL, (GW); Dusky brown (5YR2/2) changing to Grayish black (N2) with Very light gray (N8) between 0.4 - 1.0', to Light brown (5YR5/6) at 2.3', and grading to Moderate reddish brown (10R4/6) at 3.0'; abundant coarse sand and roots, loose.	Complete borehole number is B3890R107.
SS	2.0	1.9	10 8 4 5				54.0				3.3 - 4.2 ft: Silty SAND, (SM); Grayish brown (5YR3/2) to Dusky brown (5YR2/2), moderately dense, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.6	0.9	2 4 12 50/2"				52.7 52.1 52.0 51.8 51.5 51.1			5	4.2 - 4.5 ft: Silty SAND, (SM); Black (N1), fine to medium sand, moist.	Spoon refusal at 5.6'. Augered to 6.0'.
SS	0.5	0.2	50/6"				50.0 49.8 49.5				4.5 - 4.9 ft: SAND, (SW); Grayish brown (5YR3/2), fine grained, poorly sorted with minor gravel up to 5 cm.	Spoon refusal at 6.5'. Augered to total depth of 6.5'. 3" PVC casing inserted to 6.0' for gamma-logging.
											6.0 - 6.2 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, friable, moist.	PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
TOTAL DEPTH = 6.5 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R107
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R108
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9400.0; E 10200.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
9-20-90	9-20-90	Hydro Group, Inc.	Mobile B-80		8"	2.0	5.3	7.3		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.7/64*		0	4	NA	56.0	NA / NA		2.0/54.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME IN MIN.						
SS	2.0	1.3	16 18 13 10				58.0				0.0 - 1.3 ft: FILL; Gravelly Sand; Black (N1) to Grayish black (N2), gravel up to 1 cm, abundant coarse-grained sludge-like material between 1.0 - 1.3', loose, dry.	Complete borehole number is B3890R108.
SS	2.0	1.2	nr				54.7 54.0				2.0 - 7.3 ft: Silty SAND to Sandy GRAVEL, (SM); Blackish red (5R2/2) changing to Grayish red (10R4/2) and to Dark reddish brown (10R3/4) at 4.5', pebbles up to 1 cm between 2.0 - 4.5', gravel increasing with depth, moderately dense to dense, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. nr = not recorded.
SS	2.0	0.9	5 5 7 36				52.8 52.0 51.1	5				
SS	1.3	1.3	17 47 50/4*				50.0 48.7					
TOTAL DEPTH = 7.3 FT.											Spoon refusal at 7.3'. Augered to total depth of 7.3'. 3" PVC casing inserted to 6.5' for gamma-logging. PVC casing was removed after logging; hole was grouted to surface and covered with gravel.	

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: Stepan Property

Last Update: 03-19-92

HOLE NO. R108



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R109
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9410.0; E 10300.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
9-20-90	9-20-90	Hydro Group, Inc.		Mobile B-80	8"	6.8	3.2	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
6.8/68*		0	5	NA	56.0	NA		6.8/49.3		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.5	2 12 14 20				56.0				0.0 - 6.8 ft: FILL. 0.0 - 0.2 ft: Topsoil with roots. 0.2 - 0.5 ft: Coal fragments with sand, Black (N1), some roots. 0.5 - 1.0 ft: Gravelly Sand; Dark reddish brown (10R3/4), medium sand with coal fragments up to 1 cm, poorly sorted, loose, dry. 1.0 - 5.1 ft: Sandy Gravel; Dark reddish brown (10R3/4), Grayish red (10R4/2) between 2.4 - 4.0', Grayish brown (5YR2/2) between 4.9 - 5.1'; gravel is predominately sandstone; some coal fragments between 4.0 - 4.9'; mixed with sludge fragments, Light gray (N7), between 4.9 - 5.1'; loose, dry. 5.1 - 6.8 ft: Silty Sand; Dark reddish brown (10R4/2), common pebbles up to 1 cm, some coal fragments, moist	Complete borehole number is B3890R109.
SS	2.0	0.9	11 28 20 18				54.5 54.0 53.1					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	22 5 7 6				52.0 50.4 50.0	5				
SS	2.0	1.5	43 23 20 30				49.3 48.5 48.0				6.8 - 9.3 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, well cemented, fractured, moist to wet at 8.2'.	
SS	2.0	1.3	21 46 31 28				46.7 46.0					
										TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was grouted to surface and covered with gravel.	
<p>* Core recovery refers to total rock & soil sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R109
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R110

SITE
Stepan Property

COORDINATES
N 9310.0; E 10250.0

ANGLE FROM HORIZ.
Vertical

BEARING

BEGUN
9-24-90

COMPLETED
9-24-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL
Mobile B-80

SIZE
8"

OVERBURDEN
13.0

ROCK (FT.)
1.0

TOTAL DEPTH
14.0

CORE RECOVERY (FT./%)
9.4/67*

CORE BOXES
0

SAMPLES
7

EL. TOP CASING
NA

GROUND EL.
55.0

DEPTH/EL. GROUND WATER
NA / NA

DEPTH/EL. TOP OF ROCK
13.0/42.0

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH
none

LOGGED BY:

S. Knuttel/R. Cook *[Signature]*

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.6	20 28 20 13				55.0					
SS	2.0	0.3	nr				53.4 53.0 52.7				0.0 - 6.6 ft: FILL: Sandy Gravel to Silty Gravelly Sand, Brownish gray (5YR4/1) changing to Grayish red (10R4/2) at 0.3', gravel up to 3 cm, abundant coal fragments; layer of fine coal sand between 1.2 - 1.6'. Black (N1), moderately well sorted, moist.	Complete borehole number is B3890R110. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.7	nr				51.0 50.3	5				
SS	2.0	2.0	nr				49.0 48.4				6.6 - 10.6 ft: Silty CLAY, (CL); Light olive gray (5Y6/1), very fine grained, clay -60-70%, silt -20-30%, soft, dry to moist.	nr = not recorded (blow counts not obtained due to changing of geologists).
SS	2.0	1.5	nr				45.5 45.0 44.4	10				
SS	2.0	1.8	nr				43.2 43.0				10.6 - 13.0 ft: Silty SAND, (SM); Moderate brown (5YR3/4), fine sand -40-50%, silt -30-40%.	
SS	2.0	1.5	nr				42.0 41.5 41.0				13.0 - 14.0 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, moderately hard, very thinly bedded 1/2 - 2".	Augered to total depth of 14.0'. 3" PVC casing inserted to 11.5' for gamma-logging.
TOTAL DEPTH = 14.0 FT.											PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R110



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R111

SITE

Stepan Property

COORDINATES

N 9300.0; E 10150.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

9-24-90

COMPLETED

9-24-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

12.0

ROCK (FT.)

0.0

TOTAL DEPTH

12.0

CORE RECOVERY (FT./%)

6.6/55*

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

55.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

R. Cook

(Template: MYWD)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.4	7				55.0					<p>0.0 - 4.4 ft: FILL; Gravelly, Silty Sand, Dusky brown (5YR2/2) changing to Grayish black (N2) at 1.2' and to Dark yellowish brown (10YR4/2) at 2.4', very fine to medium grained, sand -30-40%, silt -30-40%, gravel up to -20%, clay -10-20%, low plasticity, moist.</p> <p>4.4 - 6.5 ft: Silty SAND, (SM); Grayish brown (5YR3/2), sand -40%, silt -30-40%, clay -10-20%, moist, moisture content increasing at 6.0 ft.</p> <p>6.5 - 11.4 ft: Silty CLAY, (CL); Grayish black (N2) changing to Grayish brown (5YR3/2) at 8.7'; fine grained, sand content increases between 8.5 - 8.7', rounded, poorly sorted; very stiff to hard at 10.0', dry.</p>	<p>Complete borehole number is B3890R111.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Spoon refusal at 11.7'</p>
			14				53.6						
SS	2.0	0.7	11				53.0						
			12				52.3						
			5				51.0						
SS	2.0	0.6	3				50.6						
			3				50.4	5					
			6				49.0						
SS	2.0	0.7	9				48.5						
			10				48.3						
			11										
			10										
SS	2.0	1.8	10				47.0						
			20										
			32										
			19										
SS	1.7	1.4	15				45.2						
			23				45.0	10					
			30										
			50/3"				43.6						
							43.0						
TOTAL DEPTH = 12.0 FT.												<p>Augered to total depth of 12.0'.</p> <p>3" PVC casing inserted to 12.0' for gamma-logging.</p> <p>PVC casing was removed after logging; hole was backfilled with drilling spoils.</p> <p>* Core recovery refers to total rock & soil sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R111



GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R112
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9,202.0; E 10,045.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
9-24-90	9-25-90	Hydro Group, Inc.	Mobile B-80		8"	11.7	1.8	13.5			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
10.0/74*		0	7	NA	55.0	5 / NA / NA		11.7/43.3			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			R. Cook/S. Knuttel <i>[Signature]</i>						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	4 6 21 20				55.0			0.0 - 2.3 ft: FILL ; Sand, silt and brick fragments, Grayish black (N2), stiff, dry.	Complete borehole number is B3890R112.
SS	2.0	1.8	5 15 13 10				53.6 53.0 52.7			2.3 - 4.8 ft: Silty SAND, (SM) ; Moderate brown (5YR3/4), fine to medium grained, rounded, stiff, dry.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	8 6 5 5				51.2 51.0 50.2	5		4.8 - 6.5 ft: SILT, (ML) ; Grayish black (N2), moderately stiff, dry.	
SS	2.0	1.1	7 8 9 11				49.2 49.0 48.5			6.5 - 11.7 ft: SAND, (SP) ; Dark yellowish brown (10YR4/2) changing to Grayish black (N2) at 9.0', thin bands interlayered with silt similar to unit above, -50/50 mix, moderately dense, very fine to fine grained, moist.	Spoon refusal at 13.5'. Augered to total depth of 13.5'. 3" PVC casing inserted to total depth for gamma-logging.
SS	2.0	1.8	10 12 22 28				47.9 47.0			11.7 - 13.5 ft: SANDSTONE ; Moderate reddish brown (10R4/6), fine to medium rounded grained, slightly weathered; 7 cm limestone pebble inclusion, Dark gray (N3), between 12.0 - 12.2'	PVC casing was removed after logging; hole was grouted to -4' below surface and remaining hole backfilled with drilling spoils.
SS	2.0	1.9	15 16 22 46				45.2 45.0	10			
SS	1.5	0.2	41 46 50/6"				43.3 43.1 43.0 42.8 41.5				
TOTAL DEPTH = 13.5 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 10-05-92	HOLE NO. R112
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GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R114**

SITE **Stepan Property** COORDINATES **N 9240.0; E 10260.0** ANGLE FROM HORIZ **Vertical** BEARING **-----**

BEGUN **9-25-90** COMPLETED **9-25-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Tripod** SIZE **3.5"** OVERBURDEN **4.0** ROCK (FT.) **0.0** TOTAL DEPTH **4.0**

CORE RECOVERY (FT./%) **1.0/25*** CORE BOXES **0** SAMPLES **2** EL. TOP CASING **NA** GROUND EL. **51.0** DEPTH/EL. GROUND WATER **NA / NA** DEPTH/EL. TOP OF ROCK **NA/NA**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

(Template: MYWD)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.0	nr					51.0					
								50.0				0.0 - 1.0 ft: FILL. 0.0 - 0.7 ft: Clayey, Silty Sand; Moderate brown (5YR3/4), sand -40-60%, silt -30-40%, clay -10%. 0.7 - 1.0 ft: Sand to Silty Sand; Grayish black (N2), sand -50%, silt -30-40%, clay -10%.	Complete borehole number is B3890R114. Borehole sampled by TMA/Eberline Corp.
SS	2.0	nr	nr					47.0					Drilling terminated due to high ppm in breathing area; 2 - 4' spoon not opened. Borehole backfilled with drilling spoils. nr = not recorded.
TOTAL DEPTH = 4.0 FT.													

Coordinates are approximated, not measured.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **R114**
HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R115

SITE

Stepan Property

COORDINATES

N 9325.0; E 10300.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

9-25-90

COMPLETED

9-25-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

8.5

ROCK (FT.)

2.3

TOTAL DEPTH

10.8

CORE RECOVERY (FT./%)

7.1/66*

CORE BOXES

0

SAMPLES

6

SEL. TOP CASING

NA

GROUND EL.

55.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

8.5/46.5

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.3	5 7 8 9		55.0				0.0 - 4.9 ft: FILL ; Sandy, Silty Gravel; Grayish black (N2) changing to Blackish red at 2.3', to Grayish black (N2) at 2.7', to Moderate brown (5YR3/4) at 4.0' and to Black (N1) at 4.6'; poorly sorted, root material present between 2.7 - 3.0', loose, dry to moist.	Complete borehole number is B3890R115.
SS	2.0	1.4	7 8 7 5		53.7					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	9 5 5 5		53.0					
SS	2.0	1.4	9 5 5 5		51.8					
SS	2.0	1.4	9 5 5 5		51.0					
SS	1.4	0.8	7 18 50/5"		50.1	5			4.9 - 6.3 ft: CLAY (CL) ; Black (N1) with Light olive (10Y5/4) and Grayish olive green (5GY3/2), blocky.	Spoon refusal at 7.4'
SS	1.4	0.8	7 18 50/5"		49.6				6.3 - 8.5 ft: PEAT (Pt) ; wood material with Black (N1) coating, block of wood between 6.3 - 6.6'.	Augered to 8.0'
SS	1.7	1.6	20 18 9 50/2"		49.0				8.5 - 10.8 ft: SANDSTONE ; Moderate reddish brown (10R4/6), fine to medium grained, thinly layered, weathered, hard.	Spoon refusal at 9.7'
SS	1.7	1.6	20 18 9 50/2"		48.7					Hard drilling between 9.5 - 10.0'
SS	1.7	1.6	20 18 9 50/2"		48.4					Augered to 10.0'
SS	0.8	0.8	25 50/3"		47.0					Spoon refusal at 10.8'
SS	0.8	0.8	25 50/3"		46.5					
SS	0.8	0.8	25 50/3"		45.4	10				
SS	0.8	0.8	25 50/3"		45.0					
SS	0.8	0.8	25 50/3"		44.2					
									TOTAL DEPTH = 10.8 FT.	
									3" PVC casing inserted to 10.0' for gamma-logging.	
									PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
									* Core recovery refers to total rock & soil sample.	
									Ground elevation estimated from site topographic map.	
									Description & classification by visual examination of sample.	
									Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

R115



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R116					
Stepan Property				N 9400.0; E 10400.0		ANGLE FROM HORIZ		BEARING					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
9-25-90	9-25-90	Hydro Group, Inc.	Soil Sentry		8"	2.0	0.0	2.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
1.6/80*		0	1	NA	55.0	/ NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel								
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.							
SS	2.0	1.6	10 16 27				55.0				0.0 - 1.6 ft: FILL; Clayey Gravel, Grayish black (N2), changing to layered red bricks with mortar.	Complete borehole number is B3890R116.	
							53.4 53.0				TOTAL DEPTH = 2.0 FT.	Borehole terminated by Eberline Corp at 2' because of high organic vapors in breathing zone. Borehole backfilled with drilling spoils.	
<p>* Core recovery refers to total rock & soil sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>													
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				Stepan Property		Last Update: 03-19-92		HOLE NO. R116	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R117				
SITE			COORDINATES			ANGLE FROM HORIZ BEARING						
Stepan Property			N 9700.0; E 9800.0			Vertical						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
9-25-90	9-26-90	Hydro Group, Inc.	Soil Sentry		8"	13.0	0.2	13.2				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
12.7/96*		0	8	NA	57.0	NA / NA		13/44.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.							TIME MIN.
SS	2.0	1.8	1	12"			57.0				0.0 - 12.8 ft: FILL. 0.0 - 0.3 ft: Topsoil. 0.3 - 6.0 ft: Sludge; Very light gray (N8), chalky, changing with depth below 2.0' to more cottony texture with darker color, moist.	Complete borehole number is B3890R117.
SS	2.0	2.0	2	5			55.2 55.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	1	3				5				
SS	2.0	1.9	2	2							6.0 - 7.0 ft: Sandy Silt; Grayish black (N2), soft, moist.	
SS	2.0	2.0	5	4			49.1 49.0				7.0 - 7.9 ft: Sludge; Light greenish gray (5GY8/1), soft, cottony to chalky texture, moist.	
SS	2.0	2.0	5	4				10			8.0 - 8.6 ft: Clayey Silt; Moderate brown (5YR3/4), with organic matter present, soft, wet.	
SS	2.0	2.0	4	4							8.6 - 12.8 ft: Sludge; Light greenish gray (5GY8/1) changing to Moderate olive brown (5Y4/4) at 11.0', and to Olive black (5Y2/1) with depth, cottony texture, vertically layered with above sediment, trace gravel, soft, moist.	Spoon refusal at 12.8' Augered to 13.0'
SS	0.8	0.8	5	50/4"			44.2 44.0					Spoon refusal at 13.2'
SS	0.2	0.2	50/3"				43.8				13.0 - 13.2 ft: SANDSTONE; Dark reddish brown (10YR3/4), hard.	3" PVC casing inserted to 13.0' for gamma-logging.
TOTAL DEPTH = 13.2 FT.											PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
											* Core recovery refers to total rock & soil sample.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination of sample.	
											Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Stepan Property		Last Update: 03-19-92		HOLE NO. R117		



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: R118

SITE: Stepan Property
 COORDINATES: N 9550.0; E 9800.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 9-26-90
 COMPLETED: 9-26-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Mobile B-80
 SIZE: 8"
 OVERBURDEN: 12.8
 ROCK (FT.): 1.9
 TOTAL DEPTH: 14.7

CORE RECOVERY (FT./X): 8.6/59*
 CORE BOXES: 0
 SAMPLES: 8
 EL. TOP CASING: NA
 GROUND EL.: 55.0
 DEPTH/EL. GROUND WATER: NA
 DEPTH/EL. TOP OF ROCK: 12.8/42.2

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.4	4 4 14 14				55.0		0.0 - 10.0 ft: FILL	Complete borehole number is B3890R118. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 7.0' Augered to 8.0'. Augered to 14.0'. Spoon refusal at 14.7' 3" PVC casing inserted to 14.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS	2.0	1.2	12 16 18 9				53.6 53.0		0.0 - 2.7 ft: Gravelly, Sandy Silt, Grayish brown (5YR3/2) changing to Moderate brown (5YR4/4) at 0.6', poorly sorted, with roots, dry, loose.		
SS	2.0	0.7	4 3 1 4				51.8 51.0 50.3	5	2.7 - 3.2 ft: Gravelly, Sandy Silt with coal and sludge; Brownish black (5YR2/1), sludge is Very light gray (N8); sandstone cobble present between 3.0 - 3.2'. 4.0 - 9.6 ft: Gravelly, Sandy Silt with sludge; Dark reddish brown (10R3/4), changing to Brownish black (5YR2/1) with Light gray (N7) sludge material at 6.0'; moist to wet at 4.3', becoming fluid at 8.0'.		
SS	1.0	0.2	12 50/6"				49.0 48.8				
SS	2.0	2.0	6 7 6 10				47.0		9.6 - 9.8 ft: Sand, Grayish brown (5YR3/2), fine grained. 9.8 - 10.0 ft: Piece of tire.		
SS	2.0	1.2	14 26 31 36				45.0 43.8	10	10.0 - 12.8 ft: SAND, (SP); Moderate brown (5YR3/4) changing to Grayish brown (5YR3/2) at 10.4' and to Dark gray (N2) at 10.8', fine grained.		
SS	2.0	1.2	21 30 36 50				43.0 42.2 41.8		12.8 - 14.7 ft: Sandy GRAVEL, (GW); Dark reddish brown (10R3/4); changing to sandstone at 14.0', fine grained, hard, weathered.		
SS	0.7	0.7	20 50/3"				41.0 40.3				
TOTAL DEPTH = 14.7 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER
 SITE: Stepan Property
 Last Update: 03-19-92
 HOLE NO.: R118



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
				FUSRAP		14501	1 OF 1	R119	
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING	
Stepan Property			N 9400.0; E 9850.0			Vertical		-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
9-26-90	9-26-90	Hydro Group, Inc.	Soil Sentry		8"	2.7	3.3	6.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
4.8/80*		0	3	NA	56.0	7 / NA 2 / NA		2.7/53.3	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:					
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>					
(Template: MYWD)									
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE LOSS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	DESCRIPTION AND CLASSIFICATION
				LOSS G.P.M.	PRESS. P.S.I.	TIME IN MIN.			
SS	2.0	1.6	2 6 10 16				56.0		<p>0.0 - 1.6 ft: FILL; Soil, Moderate brown (5YR3/4), changing to a Silty Gravel at 0.8', Brownish black (5YR2/1), and to Silty Sand at 1.0', Moderate brown (5YR3/4), micaceous appearance, platy, clear-yellow, resin compound.</p> <p>2.0 - 2.7 ft: Silty CLAY, (CL); Moderate brown (5YR3/4), high plasticity, very fine grained, poorly graded, stiff, moist.</p> <p>2.7 - 3.5 ft: Silty CLAY, (CL); Dark reddish brown (10R3/4), very fine grained, clay -60%, silt -30%, very stiff, high plasticity, moist.</p>
SS	2.0	1.5	10 12 16 10				54.4 54.0 53.3 52.5 52.0		
SS	2.0	1.7	8 18 15 18				50.3 50.0		
<p>TOTAL DEPTH = 6.0 FT.</p> <p>Augered to total depth of 6.0'.</p> <p>3" PVC casing inserted to 5.0' for gamma-logging.</p> <p>PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.</p>									
<p>* Core recovery refers to total rock & soil sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>									
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Last Update:		HOLE NO.	
			Stepan Property			03-19-92		R119	



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R120

SITE

Stepan Property

COORDINATES

N 9400.0; E 9950.0

ANGLE FROM HORIZON

Vertical

BEARING

BEGUN

9-26-90

COMPLETED

9-26-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

5.1

ROCK (FT.)

2.9

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

5.6/70*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

5.1/49.9

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.8	6	12				55.0				(Template: NYWD) Complete borehole number is B3890R120. Borehole sampled and gamma-logged by TMA/Eberline Corp. Rock in bottom of 6 - 8' spoon. Augered to total depth of 8.0'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
			12					53.7			0.0 - 1.3 ft: FILL.		
			9					53.4			0.0 - 0.4 ft: Silty Sand.		
			9					53.2			0.4 - 0.6 ft: Silty Clay; Moderate yellowish brown (10YR5/4), clay -60%, silt -40%.		
			5					53.0			0.6 - 1.0 ft: Silty Gravel; Brownish Black (5YR2/1).		
			4					51.6			1.0 - 1.5 ft: Debris, micaceous, platy, fibrous material.		
			4					51.0			1.5 - 1.6 ft: Silty GRAVEL, (GM); Olive Brown (5Y2/1).		
			4					49.9	5		1.6 - 5.1 ft: Silty CLAY, (CL); Moderate brown (5YR3/4 changing to 5YR4/4 at 2.0' and back to 5YR3/4 at 2.9').		
			10					49.4			5.1 - 6.8 ft: CLAY, (CL); Dark reddish brown (10R3/4), fine grained, poorly graded, moderately stiff.		
			20					48.2					
								47.0			TOTAL DEPTH = 8.0 FT.		

SS = SPLIT SPOON; NQ = CORE BARREL;
 HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

R120



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R121

SITE

Stepan Property

COORDINATES

N 9248.0; E 9950.0

ANGLE FROM HORIZON

Vertical

BEARING

BEGUN

9-27-90

COMPLETED

9-27-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

8.6

ROCK (FT.)

3.4

TOTAL DEPTH

12.0

CORE RECOVERY (FT./%)

9.5/79*

CORE BOXES

0

SAMPLES

6

SEL. TOP CASING

NA

GROUND EL.

55.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

8.6/46.4

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.7	3	8					55.0					
			11						54.5				0.0 - 0.5 ft: TOPSOIL; Sandy Silt, Grayish brown (5YR3/2), silt -50%, sand -40%, clay -10%, loose, moist.	Complete borehole number is B3890R121.
			17					54.0						
SS	2.0	1.7	12	10					53.3				0.5 - 1.0 ft: Silty CLAY, (CL); Dark reddish brown (10R3/4), clay -50%, silt -30-40%, sand -10%.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			11					53.0						
			17						52.0				1.0 - 3.0 ft: Gravelly SAND, (SW); Dusky brown (5YR2/2), rounded to angular grains, well graded, some silt, no plasticity, dry.	
SS	2.0	1.8	12	11					51.3				3.0 - 4.2 ft: Silty CLAY, (CL); Dusky brown (5YR2/2) changing to Dark reddish brown (10R3/4) at 4.0', silt content decreases below 4.0', low plasticity, moist.	
			11						51.0					
			12						50.8					
			11						50.5	5			4.2 - 4.5 ft: Silty SAND, (SM); Moderate brown (5YR3/4), fine grained, rounded, low plasticity.	
									50.2					
SS	2.0	1.4	4	5					49.2				4.5 - 4.8 ft: CLAY, (CL); Dark reddish brown (10R3/4), medium grained, hard.	
			21						49.0					
			23						48.3				4.8 - 6.7 ft: Silty SAND, (SM); Moderate brown (5YR4/4), medium grained, rounded, poorly sorted, moist.	
									47.6					
SS	2.0	1.4	11	9					47.0				6.7 - 7.4 ft: CLAY, (CL); Moderate brown (5YR4/4) changing to Dark reddish brown at 7.1', very fine to fine grained, poorly graded, stiff, moist.	
			12						46.4					
			8						45.6					
									45.0	10			8.0 - 8.6 ft: Sandy SILT, (ML); Grayish brown (5YR3/2), very fine grained, poorly graded, rounded, silt -50%, sand -30-40%, moist.	
SS	2.0	1.5	7	7					45.0				8.6 - 11.5 ft: CLAY, (CL); Blackish red (5R2/2) changing to Dusky red (5R3/4) at 10.0', very fine grained, poorly graded, very stiff, moist.	
			13						43.5					
			19						43.0					
TOTAL DEPTH = 12.0 FT.													Augered to total depth of 12.0'.	
													3" PVC casing inserted to 12.0' for gamma-logging.	
													PVC casing was removed after logging; hole backfilled with grout and drilling spoils.	
													* Core recovery refers to total soil & rock sample.	
													Ground elevation estimated from site topographic map.	
													Description & classification by visual examination of sample.	
													Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

R121



GEOLOGIC DRILL LOG PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R122**

SITE **Stepan Property** COORDINATES **N 9000.0; E 9900.0** ANGLE FROM HORIZ **Vertical** BEARING **-----**

BEGUN **9-27-90** COMPLETED **9-27-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Mobile B-80** SIZE **8"** OVERBURDEN **4.0** ROCK (FT.) **4.0** TOTAL DEPTH **8.0**

CORE RECOVERY (FT./%) **4.9/61*** CORE BOXES **0** SAMPLES **4** EL. TOP CASING **NA** GROUND EL. **51.0** DEPTH/EL. GROUND WATER **NA** DEPTH/EL. TOP OF ROCK **4.0/47.0**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

SAMP AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER RETURN, CHARACTER OF DRILLING, ETC.	
												PRELIM. TESTS
SS	2.0	1.6	4 8 7 10				51.0			0.0 - 2.2 ft: Sandy SILT (ML) ; Moderate reddish brown (10R4/6) changing to Brownish black (5YR2/1) at 1.1, very fine grained, rounded, poorly graded, silt -60-70%, sand -20-30%, clay -10%, some root fragments, low plasticity, dry to moist.	Complete borehole number is B3890R122. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 2.2'.	
SS	0.2	0.2	60/3*			49.4 49.0 48.8						
SS	2.0	1.3	7 17 21 27			47.0 45.7	5		4.0 - 7.8 ft: CLAY (CL) ; Dark reddish brown (10R3/4), very fine to fine grained, poorly graded, low plasticity, moist.			Augered to 4.0'
SS	2.0	1.8	7 26 14 21			45.0 43.2 43.0						
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **R122**



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R123				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
Stepan Property			N 9700.0; E 9900.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
9-27-90	9-27-90	Hydro Group, Inc.		Mobile B-80		8"	4.0	0.0	4.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.1/78*		0	2	NA	57.0	NA / NA		NA / NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											DESCRIPTION AND CLASSIFICATION	
SS	2.0	1.7	10 12 16 8				57.0				0.0 - 3.4 ft: FILL.	Complete borehole number is B3890R123. Borehole sampled by TMA/Eberline Corp. Augered to 4.0'. Drilling terminated due to high LEL readings. Hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
							55.3				0.0 - 1.5 ft: Silty Sand; Moderate brown (5YR3/4), very fine grained, poorly graded, sand -40-60%, silt -40-50%, low plasticity, dry.	
SS	2.0	1.4	9 14 18 10				55.0				1.5 - 3.2 ft: Sand; Brownish black (5YR2/1), very fine to coarse grained, vitreous, low plasticity, fluid present in soil nodules when squeezed.	
							53.6				3.2 - 3.4 ft: Clay; Very pale orange (10YR8/2), very fine grained, stiff, low plasticity, dry.	
							53.0				TOTAL DEPTH = 4.0 FT.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Last Update:		HOLE NO.				
			Stepan Property			03-19-92		R123				



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
			FUSRAP	14501	1 OF 1	R124
SITE		COORDINATES			ANGLE FROM HORIZ. BEARING	
Stepan Property		N 10000.0; E 10525.0			Vertical	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
9-27-90	9-27-90	Hydro Group, Inc.	Mobile B-80	8"	6.2	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
4.6/74*		0	3	NA	75.0	NA / NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Robert Cook		

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								75.0				(Template: MYWD)	
								71.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R124.
SS	1.5	1.5	10	25								0.5 - 6.2 ft: FILL.	Augered through asphalt to 0.5'.
			21									0.5 - 3.0 ft: Sandy Silt; Moderate reddish brown (10R4/6), red bed pebbles up to 5 cm, dry.	
SS	2.0	1.4	12	7				71.6				3.0 - 6.2 ft: Sludge; Light gray (N7), clayey, very fine grained, high plasticity, moist; changing to Grayish black (N2) at 3.2' and to Light gray (N7) at 4.0'; very fine grained, some roots, soft below 4.0'; color change to White (N9) and to Light Gray (N7) at 4.8', very stiff, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			12	5				71.0					
SS	2.0	1.5	4	4				69.5	5				Augered to 6.0'.
			5	25				69.0					Spoon refusal at 6.2'; hollow sound and excessive bounce resulting from spoon against some object.
SS	0.2	0.2	60/2*					68.8					3" PVC casing inserted to 6.0' for gamma-logging.
													PVC casing was removed after logging and hole backfilled with grout.
TOTAL DEPTH = 6.2 FT.													

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R124
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
SITE				COORDINATES		14501	1 OF 1	R125		
Stepan Property				N 10000.0; E 10550.0		Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
9-27-90	9-27-90	Hydro Group, Inc.		Mobile B-80	8"	13.3	0.0	13.3		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
9.1/68*		0	7	NA	74.0	NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						74.0			(Template: MYWD)	
SS	1.5	1.1	12 15 15			73.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R125.
SS	2.0	1.5	11 15 18 24			72.4 72.0			0.5 - 12.6 ft: FILL 0.5 - 4.6 ft: Sandy Silt (ML); Moderate reddish brown (10R4/6) changing to Moderate brown (5YR3/4) at 2.0'; pebbles up to 2.5" with some red bed cobbles; loose to stiff to very stiff with depth; dry.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	6 6 5 7			70.5 70.0	5		4.6 - 10.8 ft: Sludge; White (N9) and Medium dark gray (N4) swirls, clayey, very fine grained, >5% plant material between 6.0 - 7.5', high plasticity, moist.	
SS	2.0	1.5	1 2 2 3 7			68.2 68.0				
SS	2.0	1.5	1 2 2 7			66.5 66.0				
SS	2.0	1.1	5 2 1 1			64.5 64.0	10			
SS	1.3	0.6	1 1 50/4"			62.9 62.0 61.4			10.8 - 11.1 ft: Sludge; White (N9) to Pale yellowish orange (10YR8/6) clayey, odorous, smells like ammonia, very pungent. 12.0 - 12.6 ft: Sludge; White (N9), very clean, that changes to Grayish yellow (5Y8/4) upon exposure to air, clayey; stronger odor than above.	Augered to 13.2'; spoon refusal at 13.3', spoon bounced and made sound similar to Hole R124.
						60.7			TOTAL DEPTH = 13.3 FT.	3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with grout and drilling spoils.
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER										* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SITE								Last Update:		HOLE NO.
Stepan Property								05-19-92		R125



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R126
SITE Stepan Property		COORDINATES N 10000.0; E 10600.0			ANGLE FROM HORIZ BEARING Vertical	
BEGUN 9-28-90	COMPLETED 10-1-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 10.6	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 6.8/64*		CORE BOXES 0	SAMPLES 6	EL. TOP CASING NA	GROUND EL. 73.0	DEPTH/EL. GROUND WATER NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook		

SAMP. TYPE SAND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
							73.0			(Template: MYWD)	
SS	1.5	1.4	2 18 36				72.8 72.5			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R126.
SS	2.0	1.9	40 26 27 35				71.1 71.0			0.5 - 7.3 ft: FILL. 0.5 - 5.0 ft: Sandy Silt to Silty Clay; Moderate reddish brown (10R4/6), fine to medium grained, silt -60%, sand -30%, clay -10%, dense, dry; silt content decreasing below 2.0', very fine grained, clay -50%, silt -40%, sand -10%; sandstone cobble at 3.9', dry.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	18 10 11 14				69.1 69.0	5		5.0 - 7.3 ft: Sludge; Medium gray (N5) changing to Very light gray (N8) with Dark greenish gray (5GY4/1) swirls at 6.0', very fine to fine grained, clayey, moderately stiff changing to soft at 6.0', low plasticity, moist.	
SS	2.0	1.3	3 3 3 2				67.0 65.7			8.0 - 10.5 ft: Sandy CLAY, (CL); Moderate brown (5YR3/4), fine to medium grained, clay -50-60%, sand -30%, gravel -10% (2" maximum size), moist.	Augered to 10.0'. Spoon refusal at 10.6'; similar to Hole R124.
SS	2.0	0.6	6 3 3 3				65.0 64.4				
SS	0.6	0.5	nr				63.0 62.5 62.4	10		TOTAL DEPTH = 10.6 FT.	3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R126
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R127
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 10000.0; E 10650.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-1-90	10-1-90	Hydro Group, Inc.	Mobile B-80		8"	4.3	0.0	4.3		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
2.3/53*		0	3	NA	72.0	/ NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							72.0				
							71.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R127. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 2.9'. Augered to 4.0'. Spoon refusal at 4.3', similar hollow sound and bounce as Hole R124. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.
SS	1.5	1.2	20 19 20				70.3			0.5 - 4.3 ft: Silty SAND, (SM); Light brown (5YR5/6), fine to medium grained, some Pale reddish brown (10R5/4) sandstone pebbles up to 5 cm, dry.	
SS	0.9	0.8	27 50/6"				70.0				
							69.2				
							68.0				
SS	0.3	0.3	50/4"				67.7			TOTAL DEPTH = 4.3 FT.	

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R127
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GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
SITE										COORDINATES		14501	1 OF 1	R128
Stepan Property										N 10000.0; E 10700.0		ANGLE FROM HORIZ		BEARING
BEGUN	COMPLETED	DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-1-90	10-1-90	Hydro Group, Inc.			Mobile B-80		8"	3.1	1.4	4.5				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
3.0/67*		0	4	NA	71.0	/ NA		3.1/67.9						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:									
140 lbs/30 in		none			Robert Cook									
										(Template: MYWD)				
										DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE			
SS	1.5	1.0	28	17				71.0						
			12					70.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.		
								69.5				0.5 - 3.1 ft: Silty SAND, (SM); Light brown (5YR5/6), very fine to medium grained, sand -50-60%, silt -30-40%, moderately dense, dry.		
SS	1.9	1.9	3	12				69.0				3.1 - 4.1 ft: SANDSTONE; Pale reddish brown (10R5/4), fine grained, rounded, blocky, mica present, silica cement, dry.		
			15					67.9				TOTAL DEPTH = 4.5 FT.		
			50/4*					67.1				Spoon refusal at 3.9'. Augered to 4.0'.		
SS	0.1	0.1	60/1					67.0				Spoon refusal at 4.1'; additional spoon attempted, refusal at 4.2'.		
SS	0.1	0.0	60/1					66.9				Augered to total depth of 4.5'.		
								66.5				3" PVC casing inserted to 4.0' for gamma-logging.		
										PVC casing was removed after logging and hole backfilled with drilling spoils.				
										* Core recovery refers to total soil & rock sample.				
										Ground elevation estimated from site topographic map.				
										Description & classification by visual examination of sample.				
										Colors from "Rock-Color Chart" (GSA, 1948).				
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER					SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R128			



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R129**

SITE: **Stepan Property** COORDINATES: **N 10000.0; E 10675.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-1-90** COMPLETED: **10-1-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **4.0** ROCK (FT.): **2.5** TOTAL DEPTH: **6.5**

CORE RECOVERY (FT./%) **5.1/78*** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **72.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **4.0/68.0**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							72.0					
SS	1.5	1.5	4 6 9				71.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 3.7 ft: Silty SAND, (SM); Light brown (5YR5/6) changing to Moderate brown (5YR4/4) at 2.0', very fine to medium grained, sand -50-60%, silt -30-40%, very loose to loose, dry.	Complete borehole number is B3890R129. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	6 16 13 18				68.3 68.0				4.0 - 5.9 ft: Clayey SAND, (SC); Dark reddish brown (5YR3/4), fine to medium grained, clay -20-30%, moist; changing to sandstone, Moderate red (5R4/6), rounded fine grains, blocky, mica present, silica cement.	
SS	2.0	1.9	6 12 19 36				66.1 65.5	5				
SS	0.5	0.0	50/6"								TOTAL DEPTH = 6.5 FT.	Augered to 6.0', sampled to 6.5'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R129**



GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R130**

SITE **Stepan Property** COORDINATES **N 10000.0; E 10660.0** ANGLE FROM HORIZ **Vertical** BEARING **-----**

BEGUN **10-1-90** COMPLETED **10-1-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Mobile B-80** SIZE **8"** OVERBURDEN **4.0** ROCK (FT.) **0.4** TOTAL DEPTH **4.4**

CORE RECOVERY (FT./%) **2.9/66*** CORE BOXES **0** SAMPLES **3** EL. TOP CASING **NA** GROUND EL. **72.0** DEPTH/EL. GROUND WATER **NA** DEPTH/EL. TOP OF ROCK **4.0/6.0**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLDG. % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME IN MIN.						
							72.0				(Template: MYWD)	
SS	1.5	0.8	3 25 24				71.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R130.
SS	2.0	1.7	12 15 14 30				70.7				0.5 - 3.7 ft: Silty SAND, (SM); Moderate brown (5YR4/4), very fine to medium grained, rounded, -5% gravel up to 1.5" below 2.0', moderately dense, dry.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	0.4	0.4	50/5*				70.0				4.0 - 4.4 ft: SANDSTONE; Moderate red (5R5/4), fine to medium grained, rounded, micaceous, crystalline, silica cement, dry.	Augered to 4.0', sampled to 4.4'. 3" PVC casing inserted to 4.0' for gamma-logging.
							68.3				TOTAL DEPTH = 4.4 FT.	PVC casing was removed after logging and hole backfilled with grout drilling spoils.
							68.0					
							67.6					

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **R130**



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: R131

SITE: Stepan Property
 COORDINATES: N 10000.0; E 10515.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 10-2-90
 COMPLETED: 10-2-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Mobile B-80
 SIZE: 8"
 OVERBURDEN: 8.8
 ROCK (FT.): 0.0
 TOTAL DEPTH: 8.8

CORE RECOVERY (FT./%): 4.0/45%
 CORE BOXES: 0
 SAMPLES: 5
 EL. TOP CASING: NA
 GROUND EL.: 75.0
 DEPTH/EL. GROUND WATER: / NA
 DEPTH/EL. TOP OF ROCK: NA/NA

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRES. P.S.I.	TIME IN MIN.						
							75.0				(Template: MYWD)	
SS	1.5	1.1	9 8				74.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R131.
SS	0.9	0.9	6 50/5"				73.4 73.0				0.5 - 2.8 ft: Silty SAND (SM); Moderate reddish brown (10R4/6), very fine to fine grained, sand -50-60%, silt -30-40%.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	0.8	0.4	27 50/4"				72.2 72.1 71.0 70.6	5			2.8 - 4.4 ft: GRAVEL (GW); Dark reddish brown (10R3/4), sandstone, very fine grained, rounded, some elongated grains, iron cement.	Spoon refusal at 2.9'. Augered to 4.0'. Spoon refusal at 4.8'.
SS	0.9	0.8	28 50/5"				69.0 68.2				6.0 - 6.8 ft: Silty SAND (SM); Moderate reddish brown (10R4/6), very fine grained, sand -50%, silt -50%, some granitic pebbles up to 1.5", dense, dry.	Augered to 6.0'. Spoon refusal at 6.9'.
SS	0.8	0.8	28 50/3"				67.0 66.2				8.0 - 8.8 ft: Silty GRAVEL (GM); Moderate brown (5YR4/4), very fine grains to gravel up to 1 cm, angular to rounded grains, gravel -50%, silt -30%, sand -20%, dry.	Augered to 8.0'; sampled to 8.8' - drilling terminated due to 50% LEL readings.
TOTAL DEPTH = 8.8 FT.												3" PVC casing inserted to 8.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER
 SITE: Stepan Property
 Last Update: 03-19-92
 HOLE NO.: R131



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R132
SITE Stepan Property			COORDINATES N 9959.0; E 10515.0			ANGLE FROM HORIZ Vertical		
BEGUN 10-2-90	COMPLETED 10-2-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80		SIZE 8"	OVERBURDEN 3.1	ROCK (FT.) 4.9	TOTAL DEPTH 8.0
CORE RECOVERY (FT./%) 3.5/44*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 75.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK 3.4/71.9
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS RECOVERY	LOSS IN G.P.M.	WATER TESTS	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								75.0				
								74.8				
SS	1.5	0.5	4 10 24					74.0			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R132.
SS	1.4	1.3	18 24 50/5"					73.0			0.5 - 3.1 ft: Silty, Clayey GRAVEL, (GC); Moderate brown (5YR3/4), gravel -50%, silt -30%, clay -20-30%, maximum size 1.5", very stiff, no to low plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
								71.9				
								71.7				
SS	0.7	0.8	20 50/2"					71.0			3.1 - 6.9 ft: Silty, Gravelly CLAY; Dark reddish brown (10R3/4), very fine grained; with sandstone pebbles up to 1.5", micaceous, iron-oxide cement; very stiff, no to low plasticity, dry.	Spoon refusal at 3.4'. Augered to 4.0'. Spoon refusal at 4.7'.
								70.2	5			
SS	0.8	0.9	30 50/2"					69.0				Augered to 6.0'. Spoon refusal at 6.8'.
								68.1				
								67.0				
TOTAL DEPTH = 8.0 FT.											Augered to total depth of 8.0'. 3" PVC casing inserted to 6.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R132
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GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES			14501	1 OF 1	R133				
Stepan Property				N 9950.0; E 10550.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-2-90	10-2-90	Hydro Group, Inc.	Mobile B-80		8"	8.6	3.6	12.2					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
7.5/61*		0	7	NA	75.0	NA / NA		8.6/66.4					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>								
SAMP. TYPE	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
								75.0			(Template: MYWD)		
								74.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R133.	
SS	1.5	1.5	3					74.6			0.5 - 8.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4) changing to Moderate reddish brown (10R4/8) at 3.8', very fine grained, rounded, sand -50%, silt -40-50%, sandstone pebbles up to 1.5", loose to moderately dense at 3.8', moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
			4										
			5										
SS	2.0	1.8	6										
			11										
			16										
			27										
SS	2.0	1.8	13					71.2					
			14					71.0					
			18										
			21										
SS	2.0	1.4	12					69.2	5				
			24					69.0					
			27										
			37										
SS	0.7	0.7	22					67.6					
			50/2"					67.0					
								66.4				Spoon refusal at 8.7'.	
								66.3					
SS	0.3	0.3	50/4"					65.0	10				
								64.7					
SS	0.2	0.0	50/2"					62.8					
TOTAL DEPTH = 12.2 FT.												Spoon refusal at 12.2'. 3" PVC casing inserted to 10.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE			Stepan Property		Last Update: 03-19-92		HOLE NO. R133		



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R134
SITE Stepan Property		COORDINATES N 9960.0; E 10550.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 10-3-90	COMPLETED 10-3-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 12.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 6.8/57*		CORE BOXES 0	SAMPLES 6	EL. TOP CASING NA	GROUND EL. 75.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
							75.0				
SS	1.5	1.3	18 24 50				74.8 74.5			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R134.
SS	2.0	1.7	28 37 37 25				73.2 73.0			0.5 - 10.3 ft: FILL. 0.5 - 5.0 ft: Silty Sand; Moderate reddish brown (10R4/6), rounded, trace elongated grains, sand -50%, silt -40%, gravel -10%; some cobbles, Dark reddish brown (10R3/4), fine to medium grained, rounded to angular, well sorted, crystalline, iron-oxide cement; moderately dense, dry.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.9	19 9 6 5				71.3 71.0	5		5.0 - 10.3 ft: Sludge; White (N9) to Medium gray (N5) to Moderate reddish brown (10R4/6) swirls in a conglomerated mix, changing to more gray and less red at 6.0'; clayey to silty; with gravel -20-30%, decreasing to <10% below 6.0', maximum size 2 cm; some wood fragments present below 6.0'.	
SS	2.0	0.8	6 7 3 4				69.1 69.0 68.2				
SS	2.0	0.8	4 5 1 2				67.0 66.2				
SS	2.0	0.3	1 1 1 18				65.0 64.7	10			
							63.0			TOTAL DEPTH = 12.0 FT.	Augered to refusal at 12.0'; (similar to Hole R124). 3" PVC casing inserted to 11.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R134
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R135				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
Stepan Property			N 10019.0; E 10620.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)				
10-3-90	10-3-90	Hydro Group, Inc.		Mobile B-80		8"	6.6	3.4				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.3/73*		0	5	NA	74.0	NA		6.6/67.4				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLKS. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							74.0				(Template: MYWD)	
SS	0.8	1.1	38 50/-4"				73.8 73.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R135.
SS	2.0	1.5	29 12 10 11				72.4 72.0				0.5 - 5.0 ft: FILL. 0.5 - 2.4 ft: Silty Sand; Moderate reddish brown (10R4/6), sand -50%, silt -40%, gravel -10%; some Grayish red (10R4/2), sandstone cobbles, dry. 2.4 - 5.0 ft: Sludge; White (N9) to Medium gray (N5) to Moderate reddish brown (10R4/6) swirls in a conglomerated mix, less Moderate reddish brown color below 3.0'; clayey to silty, with sand and gravel, some wood fragments, dry.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	4 7 6 7				70.5 70.0				5.0 - 6.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4 changing to 5YR3/4 at 6.0'), very fine to medium grained, sand -50-60%, silt -30%, loose, dry.	Spoon refusal at 1.3'. - Recovery in spoon was > recorded interval driven; i.e. sample to 1.6'.
SS	1.0	1.1	31 50/-6"				69.0 68.4 68.0 67.4	5			6.6 - 10.0 ft: SANDSTONE; Grayish red (10R4/2); fine to coarse grained, coarser with depth; rounded to angular grains, with some elongated grains below 8.0'; micaceous, iron-oxide cement.	Augered to 2.0'. Spoon refusal at 7.0'. - Recovery in spoon was > recorded interval driven; i.e. sample to 7.1'.
SS	2.0	2.0	12 18 21 24				66.0					Augered to 8.0'. Hole sampled to 10.0'. 3" PVC casing inserted to 7.5' for gamma-logging.
							64.0	10			TOTAL DEPTH = 10.0 FT.	PVC casing was removed after logging and hole backfilled with grout and drilling spoils.
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER												
SITE						Last Update:		HOLE NO.				
Stepan Property						03-19-92		R135				



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R136

SITE

Stepan Property

COORDINATES

N 10024.0; E 10630.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-3-90

COMPLETED

10-3-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

2.5

ROCK (FT.)

3.5

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

2.7/45*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

73.0

DEPTH/EL. GROUND WATER

7 / NA

DEPTH/EL. TOP OF ROCK

2.5/70.5

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							73.0				(Template: NYWD)	
SS	0.9	0.9	29 / 50/5"				72.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R136.
							71.6				0.5 - 2.5 ft: Sandy SILT, (ML); Light brown (5YR5/6) gradually changing to Moderate reddish brown (10R4/6), angular to rounded with some elongated grains, silt -50-60%, sand -30-40%, gravel -10%, dense, dry.	
SS	1.4	1.1	13 / 29 / 50/5"				71.0				2.5 - 4.7 ft: SANDSTONE; Pale reddish brown (10R5/4), fine to medium grained, angular to rounded grains, micaceous, with iron cement, dry.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							70.5					
SS	0.7	0.7	23 / 50/2"				69.9					
							69.0					
							68.3					
							67.0					
TOTAL DEPTH = 6.0 FT.												
												3" PVC casing inserted to 5.5' for gamma-logging.
												PVC casing was removed after logging and hole backfilled with grout and drilling spoils.
												* Core recovery refers to total soil & rock sample.
												Ground elevation estimated from site topographic map.
												Description & classification by visual examination of sample.
												Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

R136



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
			FUSRAP	14501	1 OF 1	R137
SITE			COORDINATES		ANGLE FROM HORIZ BEARING	
Stepan Property			N 9956.0; E 10628.0		Vertical	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
10-3-90	10-3-90	Hydro Group, Inc.	Mobile B-80	8"	0.5	5.6
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
3.6/59*		0	4	NA	72.0	NA
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:	
140 lbs/30 in			none		Robert Cook	

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
							72.0			(Template: MYWD)	
							71.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	
SS	1.5	1.1	18 18 21				70.4			0.5 - 6.1 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), very fine grains to pebbles up to 2", sand -50-60%, silt -40%, gravel -15%, dense, moist.	Complete borehole number is B3890R137.
SS	1.5	1.3	21 23 50/6"				70.0				Augered through asphalt to 0.5'.
							68.7				Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.1	1.1	18-23 50/1"				68.0				Spoon refusal at 3.5'.
							66.9	5			Augered to 4.0'.
							66.0				Spoon refusal at 5.1'.
SS	0.1	0.1	50/1"				65.9				Augered to 6.0'.
										TOTAL DEPTH = 6.1 FT.	Sampled to spoon refusal at 6.1'.
											3" PVC casing inserted to 5.5' for gamma-logging.
											PVC casing was removed after logging and hole backfilled with drilling spoils.

SS = SPLIT SPOON; MQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R137
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R138

SITE

Stepan Property

COORDINATES

N 10000.0; E 10746.0

ANGLE FROM HORIZON
Vertical

BEGUN
10-3-90

COMPLETED
10-3-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL
Mobile B-80

SIZE
8"

OVERBURDEN
3.2

ROCK (FT.)
4.8

TOTAL DEPTH
8.0

CORE RECOVERY (FT./%)
6.3/79*

CORE BOXES
0

SAMPLES
4

EL. TOP CASING
NA

GROUND EL.
68.0

DEPTH/EL. GROUND WATER
NA / NA

DEPTH/EL. TOP OF ROCK
3.2/64.8

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH
none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							68.0				(Template: MYWD)	
SS	1.5	1.0	20 15 19				67.8 67.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R138. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	13 21 25 26			66.5 66.0				0.5 - 3.2 ft: Silty SAND, (SM); Light Brown (5YR5/6), sand -60%, silt -30%; angular gravel up to 1.5 cm, -15%; moderately dense, low plasticity, moist.		
SS	2.0	1.7	4 11 15 20			64.8 64.3 64.0				3.2 - 7.9 ft: SANDSTONE; Pale reddish brown (10R5/4), micaceous, crystalline, iron-oxide cement, rounded and elongate grains.		
SS	2.0	1.9	9 19 23 25			62.3 62.0						
							60.1 60.0				TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R138



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R139
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9950.0; E 10750.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-3-90	10-3-90	Hydro Group, Inc.	Mobile B-80	8"	6.0	2.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
6.0/75*		0	4	NA	68.0	NA / NA	6.0/62.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLKS. / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							68.0				(Template: MYWD)	
							67.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R139.
SS	1.5	0.9	3 6 13				66.6				0.5 - 6.0 ft: Silty SAND, (SM); Moderate reddish brown (5YR4/4) changing to Moderate reddish brown (10R4/6) at 2.0', very fine rounded grains, sand -60%, silt -40%, low plasticity, moderately dense, moist; some granitic pebbles up to 1.5" between 4.0 - 5.4'.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	11 21 28 32				66.0					
SS	1.5	1.4	14 26 50/6"				64.3 64.0					
							62.6	5				Spoon refusal at 5.5'.
SS	2.0	2.0	13 18 26 20				62.0				6.0 - 8.0 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), very fine grains, moderately dense, low plasticity, moist.	Augered to 6.0'.
							60.0				TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R139
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GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: R140

SITE: Stepan Property
 COORDINATES: N 9850.0; E 10600.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 10-4-90
 COMPLETED: 10-4-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Mobile B-80
 SIZE: 8"
 OVERBURDEN: 0.5
 ROCK (FT.): 5.5
 TOTAL DEPTH: 6.0

CORE RECOVERY (FT./%): 3.6/60*
 CORE BOXES: 0
 SAMPLES: 3
 EL. TOP CASING: NA
 GROUND EL.: 68.0
 DEPTH/EL. GROUND WATER: / NA
 DEPTH/EL. TOP OF ROCK: 0.5/67.0

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Robert Cook

SAMP TYPE	SAMP. ADV. SAND DIAM.	SAMP. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
				7 23 50/2"				68.0					
SS	1.2	1.0						67.8 67.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R140. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 1.7'. Augered to 2.0'. Spoon refusal at 4.9'. Augered to total depth of 6.0'. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.
								66.5 66.0				0.5 - 4.9 ft: Silty SAND, (SM); Dark reddish brown (10R3/4) sandstone pebbles up to 2" below 2.0'.	
SS	2.0	1.7		28 32 38 30				64.3 64.0					
SS	0.9	0.9		17 50/4"				63.1 62.0	5				
TOTAL DEPTH = 6.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL;
 HX = HAND AUGER; O = OTHER

SITE: Stepan Property
 Last Update: 03-19-92
 HOLE NO.: R140



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R141					
Stepan Property				N 9850.0; E 10700.0		ANGLE FROM HORIZ		BEARING					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-4-90	10-4-90	Hydro Group, Inc.	Mobile B-80		8"	2.0	4.0	6.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.1/68*		0	3	NA	67.0	NA		2.0/65.0					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	1.5	1.0	7 14 9					67.0 66.8 65.5 65.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R141. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	2 4 8 10					63.3 63.0			0.5 - 1.5 ft: Silty SAND, (SM); Light brown (5YR5/8), very fine to fine grained, sand -60%, silt -30%, clay -10%, moderately dense, moist; some sandstone cobbles. Dark reddish brown (10R3/4), laminated (1/8 - 1/2") to very thin bedded (1/2 - 2"), fine to medium grained, rounded, crystalline, iron-oxide cement.		
SS	2.0	1.4	18 32 30 38					61.6 61.0	5		2.0 - 5.4 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), with sandstone, fine to medium grained, iron-oxide cement, dense, moist.		
TOTAL DEPTH = 6.0 FT.											Augered to total depth of 6.0'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.		
SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER													* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SITE											Last Update: 03-19-92		HOLE NO. R141
Stepan Property													



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R142					
Stepan Property				N 9850.0; E 10500.0		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
10-4-90	10-4-90	Hydro Group, Inc.	Mobile B-80	8"	0.5	3.5	4.0						
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK							
2.7/68*	0	2	NA	67.0	NA / NA	0.5/66.5							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								67.0					
SS	1.5	1.0	3	18				66.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R142.
								65.5				0.5 - 3.7 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), very fine to fine rounded grains, sand -60%, silt -40%, some angular to rounded gravel >5%, stiff, low plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	14	27				65.0					
								63.3					
								63.0					
TOTAL DEPTH = 4.0 FT.												Augered to total depth of 4.0'. 3" PVC casing inserted to 3.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				Stepan Property		Last Update: 03-19-92		HOLE NO. R142	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R143					
Stepan Property				N 9724.0; E 10825.0		ANGLE FROM HORIZ BEARING							
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-4-90	10-4-90	Hydro Group, Inc.	Mobile B-80		8"	16.0	0.7	16.7					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
14.5/87*		0	9	NA	65.0	/ NA		16.0/49.0					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			Robert Cook							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS ON DRY	G.P.M.	PRESS. P.S.I.							TIME MIN.
SS	2.0	1.5	3	11				65.0				0.2 - 15.5 ft: FILL.	Complete borehole number is B3890R143. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 16.0'. Spoon refusal at 16.7'. 3" PVC casing inserted to 15.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			18					63.5				0.0 - 0.2 ft: Topsoil; Sandy Silt, Moderate brown (5YR4/4), some grass and roots, dry.	
SS	2.0	1.7	3	12				63.0				0.2 - 3.1 ft: Silty Sand; Dark reddish brown (10R3/4), sand -60%, silt -30%, clay -10%, some sandstone pebbles up to 1.5".	
SS	2.0	1.6	5	3				61.3				3.1 - 15.5 ft: Sludge; White (N9) and Grayish black (N2) swirls, conglomerated mixture of layers, changing to Grayish orange (10YR7/4) and Pale olive (10Y6/2) at 9.8' and to Grayish black (N2) with Black (N1), at 14.6'; clayey to silty with gravel, pungent odor, moist; texture change to fibrous at 14.6'.	
			2	2				61.0					
SS	2.0	1.6	2	2				59.4					
			2	2				59.0					
SS	2.0	2.0	3	3				57.4					
			2	2				57.0					
SS	2.0	2.0	1	1				10					
			1	1									
SS	2.0	2.0	1	1									
			2	2									
			4	4									
			4	4									
SS	0.7	0.4	10	50/2"				49.5				15.5 - 15.7 ft: Clayey SILT, (ML); Moderate brown (5YR3/4), very fine to fine grained, silt -50-60%, clay -30%, sand -10-20%, some pebbles up to 2.4 mm, low plasticity, moist.	
								49.3				16.0 - 16.4 ft: SANDSTONE; Dark reddish brown (10R3/4), very fine to fine grained, rounded, micaceous, crystalline, iron-oxide cement, dry.	
								49.0					
								48.6					
								48.3					



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R144
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Stepan Property			N 9600.0; E 10090.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-5-90	10-5-90	Hydro Group, Inc.		Mobile B-80	8"	4.0	2.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.8/63*		0	3	NA	59.0	NA / NA		4.0/55.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
							59.0				(Template: MYWD)	
SS	1.5	1.3	20 33 45				58.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R144.
SS	1.1	1.1	40 40 50/2"				57.2 57.0				0.5 - 1.8 ft: FILL; Dark yellowish brown (10YR4/2) to Grayish red (10R4/2), sand, bricks, clay, glass and gravel.	Note: hole was originally numbered B3890R144-1.
							55.9				2.0 - 3.1 ft: Silty SAND (SM); Moderate yellowish brown (10YR5/4) changing to Grayish red (10R4/2) at 2.9', fine rounded grains, sand -80%, silt -30%, clay -10%, hard below 2.9', moist.	Augered through asphalt to 0.5'.
SS	2.0	1.4	40 20 24 36				55.0				4.0 - 5.4 ft: SANDSTONE; Dark reddish brown (10R3/4), medium grained, rounded, poorly graded, micaceous, iron-oxide cement.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							53.6	5				Spoon refusal at 3.1'.
							53.0					Augered to 4.0'. Augered to total depth of 6.0'. 3" PVC casing inserted to 4.5' for gamma-logging.
TOTAL DEPTH = 6.0 FT.											PVC casing was removed after logging; and hole backfilled with grout and drilling spoils.	

* Core recovery refers: to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R144
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GEOLOGIC DRILL LOG			PROJECT			JOB NO.	SHEET NO.	HOLE NO.				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
Stepan Property			N 9725.0; E 10862.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-5-90	10-5-90	Hydro Group, Inc.	Mobile B-80		8"	14.5	1.3	15.8				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
9.9/63*		0	9	NA	64.0	/ NA		14.5/49.5				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.3	19 22 21 30				64.0				(Template: NYWD) 0.0 - 14.5 ft: FILL. 0.0 - 2.4 ft: Sandy Silt, Moderate brown (5YR3/4) changing to Dark reddish brown (10R3/4) at 0.2', very fine grained, rounded, silt - 50%, sand - 20-50%; gravel - 20%, with pebbles up to 2" below 0.2'; low plasticity. 2.4 - 14.5 ft: Sludge: Very light gray (N8) and Grayish black (N2), conglomerated swirls; clayey, some plant fibrous material at 4.5', and some wood fragments at 11.4'. Complete borehole number is B3890R145. Borehole sampled and gamma-logged by TMA/Eberline Corp. Sample is suspected of being pushed below sampler. Spoon refusal at 15.0'. Augered to 15.4'. Hole sampled to 15.8'. 3" PVC casing inserted to 14.5' for gamma-logging. PVC casing was removed after logging; hole backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS	2.0	1.9	11 13 15 12				62.7 62.0					
SS	2.0	1.4	3 9 7 5				60.1 60.0	5				
SS	2.0	1.2	4 4 4 3				58.6 58.0					
SS	2.0	0.1	3 4 5 5				56.8 56.0 55.9					
SS	2.0	1.4	6 7 3 7				54.0 52.6 52.0	10				
SS	2.0	1.6	1 2 1 1				50.4 50.0					
SS	1.0	0.6	1 50/6"				49.5 49.4					
SS	0.4	0.4	50/4"				48.6 48.2	15				
TOTAL DEPTH = 15.8 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R145



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: R146

SITE: Stepan Property
 COORDINATES: N 9779.0; E 10877.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 10-5-90
 COMPLETED: 10-5-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Mobile B-80
 SIZE: 8"
 OVERBURDEN: 2.9
 ROCK (FT.): 7.1
 TOTAL DEPTH: 10.0

CORE RECOVERY (FT./%): 8.2/82%
 CORE BOXES: 0
 SAMPLES: 5
 EL. TOP CASING: NA
 GROUND EL.: 64.0
 DEPTH/EL. GROUND WATER: / NA
 DEPTH/EL. TOP OF ROCK: 2.9/61.1

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	3 11 8 9				64.0				0.0 - 1.3 ft: TOPSOIL; Sandy Silt, Pale yellowish brown (10YR6/2) changing to Moderate reddish brown (10R4/6) at 0.6', silt -60%, sand -30%, some grass, some sandstone pebbles up to 1.5" below 0.6'.	Complete borehole number is B3890R146. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	5 5 8 13				62.7 62.4 62.0				1.3 - 2.9 ft: Gravelly CLAY, (CL); Very light gray (N8) to Dark gray (N3), very fine grained, gravel -20-30%, low plasticity, dry.	
SS	2.0	1.8	8 6 6 9				61.1 60.3 60.0				2.9 - 9.2 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), very fine to fine rounded grains, sand -50-60%, silt -40%, some sandstone cobbles below 4.0'; minor clay, content increasing to -40% at 4.6', medium plasticity, loose, moist.	
SS	2.0	1.9	10 12 15 16				58.2 58.0					
SS	2.0	1.2	21 22 15 16				56.1 56.0					
							54.8 54.0					
TOTAL DEPTH = 10.0 FT.											Augered to total depth of 10.0'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging; hole backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL;
 HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R146



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501	1 OF 1	R147					
SITE			COORDINATES			ANGLE FROM HORIZ BEARING							
Stepan Property			N 9971.0; E 10336.0			Vertical -----							
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-9-90	10-9-90	Hydro Group, Inc.		Mobile B-80		8"	6.2	0.0	6.2				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.3/69*		0	4	NA	67.0	NA/NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			Robert Cook							
SMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS	2 CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	3 10 11 8					67.0				0.0 - 5.6 ft: FILL.	Complete borehole number is B3890R147. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 5.4'. Augered to 6.0', sampled to spoon refusal at 6.2'. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging; hole backfilled with grout and drilling spoils.
SS	2.0	1.5	16 20 22 25					65.6 65.0			0.0 - 0.4 ft: Topsoil; Silty Sand, Moderate brown (5YR3/4), fine grained, sand -60%, silt -30%, low plasticity, moist. 0.4 - 5.1 ft: Sandy Silt; Dark reddish brown (10R3/4), fine to medium grained, silt -50%, sand -50%, some gravel to cobbles up to 3.0" below 2.0', low plasticity, moist.		
SS	1.4	1.4	20 22 50/5"					63.5 63.0			5.1 - 5.4 ft: Clayey Gravel; Very light gray (N7) to Grayish black (N2), conglomeratic mass, no plasticity, possible concrete, oil-sludge-like residue, pungent, solvent smell, moist.		
SS	0.2	0.0	80/2"					61.6 60.8	5		TOTAL DEPTH = 6.2 FT.		

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R147



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R148
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9850.0; E 10350.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-9-90	10-9-90	Hydro Group, Inc.	Mobile B-80		8"	6.0	0.1	6.1		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
4.5/74*		0	4	NA	63.0	↓ / NA	6.0/57.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>						

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	P.S.I.	TIME MIN.						
SS	1.8	1.0	6/4"	6			63.0				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R148.	
			6	8			62.8				0.2 - 2.8 ft: Sandy SILT, (ML); Moderate yellowish brown (10YR5/4), fine to coarse grained, subrounded to subangular, silt -70%, sand -30%, low plasticity, moist.		
SS	2.0	1.6	2	4			61.8					Augered through asphalt to 0.2'.	
			10	17			61.0				2.8 - 3.1 ft: SAND, (SW); Moderate brown (5YR4/4), fine to very coarse grained, angular to subrounded, no plasticity, moist.		
SS	1.9	1.8	21	18			60.2					Borehole sampled and gamma-logged by TMA/Eberline Corp.	
			19	50/5"			59.9				3.1 - 5.8 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), very fine to medium grained, silt -60%, sand -30%, gravel <10%, no plasticity, moist.		
SS	0.1	0.1	50/1"				59.4					Spoon refusal at 5.9'. Augered to 6.0', sampled to spoon refusal at 6.1'.	
							57.2				6.0 - 6.1 ft: SANDSTONE; Dark reddish brown (10R3/4); very fine, subrounded to subangular grains; iron-oxide cement.		
TOTAL DEPTH = 6.1 FT.												3" PVC casing inserted to 5.5' for gamma-logging.	
												PVC casing was removed after logging; hole backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R148
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
SITE				COORDINATES		ANGLE FROM HORIZ		BEARING		
Stepan Property				N 9957.0; E 10419.0		Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-9-90	10-9-90	Hydro Group, Inc.	Mobile B-80		8"	0.5	2.5	3.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
1.9/63*		0	2	NA	68.0	NA / NA		0.5 / 67.5		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>						
SAMP. AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE LOSS IN G.P.M.	WATER PRESS. TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					68.0				(Template: MYWD)	
					67.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R149.
SS	1.5	1.2	12		67.5				0.5 - 3.0 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), very fine to fine grains, silt -60%, sand -30%, low plasticity; changing to weathered sandstone at 1.7', Dark reddish brown (10R3/4), iron-oxide cement, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	0.9	0.7	35 50/4"		66.3				TOTAL DEPTH = 3.0 FT.	Spoon refusal at 2.9' Augered to 3.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging; hole backfilled with grout and drilling spoils.
					66.0					
					65.3					
					65.0					

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R149



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R150
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9959.0; E 10378.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-9-90	10-9-90	Hydro Group, Inc.	Mobile B-80		8"	5.9	1.1	7.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.8/54*		0	4	NA	66.0	NA		5.9/60.1		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
								66.0				(Template: NYWD)	
								65.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R150.
SS	1.5	1.0	9	6				64.5				0.5 - 3.1 ft: Clayey SILT, (ML); Moderate yellowish brown (10YR5/4), very fine grained, silt -60%, clay -30%, sand -10%, low plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	2	3				64.0				3.1 - 4.8 ft: SAND, (SW); Moderate brown (5YR4/4), very fine to very coarse grained, rounded to angular, rounded grains are tabular and elongated, silt content increasing to -20% at 4.0', moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
			12	28				62.9					Spoon refusal at 4.9'.
SS	0.8	0.8	23	50/3"				62.4					
								62.0					
								61.2	5				
SS	0.4	0.4	50/5"					60.1					
								59.7					
								59.0					
TOTAL DEPTH = 7.0 FT.												Augered to total depth of 7.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging; hole backfilled with grout and drilling spoils.	
												* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update: 03-19-92
HOLE NO. R150



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
SITE										COORDINATES		14501	1 OF 1	R151
Stepan Property										N 9757.0; E 10418.0		ANGLE FROM HORIZ		BEARING
BEGUN	COMPLETED	DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-9-90	10-9-90	Hydro Group, Inc.			Mobile B-80		8"	3.3	4.7	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
6.2/78*		0	4	NA	64.0	NA / NA		3.3/60.7						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:									
140 lbs/30 in		none			Robert Cook									
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	1/2 CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)		
												DESCRIPTION AND CLASSIFICATION		
SS	1.5	1.1	4	5				64.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.		
			7					63.8				0.5 - 3.3 ft: Sandy SILT, (ML); Moderate brown (5YR4/4), very fine to fine grained, silt -50%, sand -50%, no plasticity.		
SS	2.0	1.6	4	9				62.4				Augered through asphalt to 0.5'.		
			13	21				62.0				Borehole sampled and gamma-logged by TMA/Eberline Corp.		
SS	2.0	1.7	19	21				60.7				3.3 - 7.8 ft: SANDSTONE, Dark reddish brown (10R3/4), very fine grains, iron-oxide cement.		
			31	29				60.4						
			29					60.0						
SS	2.0	1.8	21	29				58.3						
			28					58.0						
			50/6"					56.2						
								56.0				TOTAL DEPTH = 8.0 FT.		
												Spoon refusal at 8.0'. Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging; hole backfilled with grout and drilling spoils.		
												* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).		
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER										SITE		Last Update:		HOLE NO.
Stepan Property										03-19-92		R151		



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R152
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9744.0; E 10266.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-10-90	10-10-90	Hydro Group, Inc.	Mobile B-80	8"	7.2	2.8	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.7/57*		0	5	NA	58.0	V / NA / NA		7.2/50.8		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								58.0					
SS	1.5	1.2	13					57.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R152. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 9.5'. Augered to 10.0'. 3" PVC casing inserted to 8.0' for gamma-logging. PVC casing was removed after logging; hole backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			19					57.5				0.5 - 6.3 ft: FILL; Gravelly SAND; Brownish black (5YR2/1) changing to Moderate brown (5YR3/4) at 2.4'; mixed with gravel-sized slag, Very light gray (N8) to White (N9) between 1.6 - 2.4'; very fine to very coarse grained, well graded, angular to subrounded, moist to wet at 6.0'.	
SS	2.0	0.9	2					56.3					
			9					56.0					
			1					55.1					
			1					54.0					
SS	2.0	0.6	2					53.4	5				
			1					52.0					
			2					51.7					
			7					50.8					
SS	2.0	2.0	5					49.0					
			31					48.0	10				
			42										
			26										
SS	1.5	1.0	11										
			26										
			50/6"										
TOTAL DEPTH = 10.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R152
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R153
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Stepan Property			N 9686.0; E 10869.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-10-90	10-10-90	Hydro Group, Inc.	Soil Sentry	8"	4.0	6.0	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
6.8/68*		0	5	NA	64.0	NA / NA	4.0/60.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.3	3	6				64.0				(Template: NYWD)	
			5	6				62.7				0.0 - 1.3 ft: Silty SAND, (SM); Dusky red (5R3/4), sand -50%, silt -40%, moist.	Complete borehole number is B3890R153.
SS	2.0	1.5	4	5				62.0				2.0 - 3.0 ft: Gravelly SILT, (GM); Grayish brown (5YR3/2), fine to very coarse grained, angular to subrounded, silt -60%, gravel -40%.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			7	4				61.0				3.0 - 3.5 ft: Silty SAND, (SM); Moderate brown (5YR3/4), moist.	
			4	6				60.5					
SS	2.0	1.5	3	4				60.0				4.0 - 9.0 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), changing to Dark reddish brown (10YR3/4) at 6.0', fine to coarse grained, subangular to subrounded, cobbles <5%, low plasticity, moist; changing to Sandstone at 9.0', very fine grained, blocky, iron-oxide cement.	
			4	6				58.5	5				
SS	2.0	1.5	2	3				58.0					
			3	5				56.5					
			5					56.0					
SS	2.0	1.0	9	16				55.0					
			19					54.0	10				
			20										
TOTAL DEPTH = 10.0 FT.												Augered to total depth of 10.0'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging; hole backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R153
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GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R154**

SITE: **Stepan Property** COORDINATES: **N 9782.0; E 10823.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-10-90** COMPLETED: **10-10-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Soil Sentry** SIZE: **8"** OVERBURDEN: **6.0** ROCK (FT.): **8.0** TOTAL DEPTH: **14.0**

CORE RECOVERY (FT./%): **9.4/67*** CORE BOXES: **0** SAMPLES: **7** EL. TOP CASING: **NA** GROUND EL.: **65.0** DEPTH/EL. GROUND WATER: **NA / NA** DEPTH/EL. TOP OF ROCK: **6.0/59.0**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.						
SS	2.0	0.4	2 14 7 8				65.0 64.6				0.0 - 5.4 ft: FILL. 0.0 - 2.3 ft: Sandy Silt; Moderate brown (5YR3/4).	Complete borehole number is B3890R154. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	3 13 5 3				63.0				2.3 - 5.4 ft: Sludge; White (N9) to Medium dark gray (N4) swirled conglomerated mass, clayey to silty, dry.	
SS	2.0	1.4	4 2 4 4				61.4 61.0					
SS	2.0	1.4	3 6 12 14				59.8 59.0	5			6.0 - 13.4 ft: Sandy SILT (ML); Moderate reddish brown (10R4/6), fine to medium grained, low plasticity, moderately dense, moist.	
SS	2.0	1.5	6 10 13 13				57.6 57.0					
SS	2.0	1.7	10 16 23 50				55.5 55.0	10				
SS	2.0	1.4	14 20 16 19				53.3 53.0					
							51.6 51.0					Augered to total depth of 14.0'. 3" PVC casing inserted to 14.0' for gamma-logging.
TOTAL DEPTH = 14.0 FT.											PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R154**



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R155**

SITE: **Stepan Property** COORDINATES: **N 9598.0; E 10425.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-10-90** COMPLETED: **10-10-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **4.0** ROCK (FT.): **0.0** TOTAL DEPTH: **4.0**

CORE RECOVERY (FT./%): **2.3/58*** CORE BOXES: **0** SAMPLES: **2** EL. TOP CASING: **NA** GROUND EL.: **59.0** DEPTH/EL. GROUND WATER: **NA / NA** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME IN MIN.						
								59.0				(Template: MYLD)	
SS	1.5	1.0	20 18 18					58.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R155. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to total depth of 4.0', pipe suspected. 3" PVC casing inserted to 3.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.
								57.5				0.5 - 2.9 ft: FILL.	
SS	2.0	1.3	4 8 11 16					57.0				0.5 - 2.9 ft: Gravelly Silt to Sand; Dark yellowish orange (10YR4/2) changing to Pale yellowish orange (10YR8/6) with Grayish black (N2) at 2.3'; with coal, Black (N1), vitreous sheen, gravelly, between 1.2 - 1.5'; very weathered or burnt below 2.3'. 2.9 - 3.3 ft: Silty Sand; Moderate brown (5YR3/4), medium to coarse sand, silt -10%, gravel -10%, no plasticity.	
								55.7					
								55.0					
TOTAL DEPTH = 4.0 FT.													

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R155**



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R156

SITE

Stepan Property

COORDINATES

N 9686.0; E 10656.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-10-90

COMPLETED

10-10-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

4.9/82*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

(Template: MYWD)

DESCRIPTION AND CLASSIFICATION

NOTES ON:
WATER LEVELS,
WATER RETURN,
CHARACTER OF
DRILLING, ETC.

Complete borehole
number is
B3890R156.

Borehole sampled and
gamma-logged by
TMA/Eberline Corp.

Auger could not be
advanced past a
depth of 5.1' due to
drill rig problems;
spoon advanced to
6.0'.

3" PVC casing
inserted to 4.5' for
gamma-logging.

PVC casing was
removed after logging
and hole backfilled
with drilling spoils.

* Core recovery refers
to total soil & rock
sample.

Ground elevation
estimated from site
topographic map.

Description &
classification by
visual examination of
sample.

Colors from
"Rock-Color Chart"
(GSA, 1948).

TOTAL DEPTH = 6.0 FT.

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.				
SS	2.0	1.8	4 5 5				67.0			
SS	2.0	1.5	14 22 26 12				65.4 65.0			
SS	2.0	1.8	15 26 37 42				63.5 63.0			
							61.2 61.0			

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.

R156



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 1	R157			
SITE			COORDINATES			ANGLE FROM HORIZ. BEARING					
Stepan Property			N 9550.0; E 10900.0			Vertical -----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-11-90	10-11-90	Hydro Group, Inc.	Mobile B-80		8"	4.7	3.3	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.0/75*		0	4	NA	59.0	NA		4.7/54.3			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>					
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
							59.0		(Template: NYWD)		
SS	1.5	1.0	30 25 12				58.8 58.5		0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R157. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
							57.6 57.4 57.0		0.5 - 1.4 ft: FILL; Grayish black (N2), coal.		
SS	2.0	1.5	7 6 6 9						1.4 - 4.7 ft: Silty SAND, (SM); Grayish brown (5YR3/2) changing to Moderate brown (5YR4/4) at 2.0', fine grained, sand -50-70%, silt -30-40%, some gravel below 2.0', no plasticity, moist.		
SS	2.0	1.8	5 6 7 15				55.5 55.0 54.3	5	4.7 - 7.7 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -60%, clay -30%, sand -10%, some sandstone pebbles up to 1", low plasticity, moist.		
SS	2.0	1.7	13 12 13 11				53.2 53.0				
							51.3 51.0		TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.	
* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Stepan Property			Last Update: 03-19-92	HOLE NO. R157	



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.
				FUSRAP	14501	1 OF 1	R158
SITE		COORDINATES			ANGLE FROM HORIZ	BEARING	
Stepan Property		N 9550.0; E 11000.0			Vertical	-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-11-90	10-11-90	Hydro Group, Inc.	Mobile B-80	8"	4.0	6.0	10.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK	
7.0/70*	0	5	NA	59.0	NA / NA	4.0/55.0	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:		
140 lbs/30 in		none			Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	% CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
								59.0					
SS	1.5	1.1	7	14				58.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R158. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
			9					57.4				0.5 - 1.6 ft: FILL; wood, coal, gravel, silty sand.	
SS	2.0	0.5	8	4				57.0				2.0 - 2.5 ft: Silty SAND, (SM); Moderate brown (5YR3/4), fine grained, low plasticity, moist.	
			4	4				56.5					
SS	2.0	1.5	4	11				55.0				4.0 - 9.9 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, with sandstone, moist.	
			22	38				53.5	5				
SS	2.0	2.0	13	11				53.0					
			12	25									
SS	2.0	1.9	11	13									
			23	50/6"									
								49.1	10				Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.
								49.0				TOTAL DEPTH = 10.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R158
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			COORDINATES	14501	1 OF 1	R160
Stepan Property			N 9686.0; E 10750.0	ANGLE FROM HORIZ		BEARING
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
10-11-90	10-11-90	Hydro Group, Inc.	Soil Sentry	8"	10.9	0.7
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
7.0/60*		0	6	NA	66.0	↓ / NA
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:	
140 lbs/30 in			none		Robert Cook <i>[Signature]</i>	

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	2 5 4				66.0				0.0 - 10.0 ft: FILL. 0.0 - 2.6 ft: Silty Sand; Moderate reddish brown (10R4/6), fine grained, sand -30-50%, silt -30-50%, gravel -20%, clay -20%, low plasticity; sandstone cobble at 2.6'. Dark reddish brown (10R4/6), blocky, iron-oxide cement.	Complete borehole number is B3890R160. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.6	5 8 12 13				64.5 64.0 63.4				4.0 - 10.0 ft: Sludge; Olive black (5Y2/1) changing to Moderate reddish brown (10R4/6) and Medium dark gray (N4) swirls at 6.0', to Grayish black (N2) at 6.5', to a conglomeratic mass of Yellowish gray (5Y8/1) and Medium light gray (N6) at 7.0'; clayey to silty, low to medium plasticity, moist to wet.	
SS	2.0	1.1	12 11 12 12				62.0 60.9	5				
SS	2.0	1.4	3 3 3 3				60.0 58.6 58.0					
SS	2.0	0.8	2 2 5 6				57.2					
SS	1.6	1.6	5 28 50 50/1"				56.0 55.1	10			10.0 - 10.9 ft: CLAY, (CL); Dark gray (N3), very fine grained, with up to -20% silt, medium plasticity, soft wet.	Augered to 10.0'.
							54.4				10.9 - 11.6 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), fine to coarse grains, sandstone cobbles present.	Spoon advanced to refusal at 11.6'. 3" PVC casing inserted to 10.5' for gamma-logging.
TOTAL DEPTH = 11.6 FT.											PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R160
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE Stepan Property				COORDINATES N 9686.0; E 10700.0		14501	1 OF 1	R161					
BEGUN 10-11-90	COMPLETED 10-11-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Soil Sentry	SIZE 8"	OVERBURDEN 4.3	ROCK (FT.) 0.0	ANGLE FROM HORIZ BEARING Vertical						
CORE RECOVERY (FT./%) 3.1/72*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 67.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA					
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.3	8 9					67.0				0.0 - 3.8 ft: FILL.	Complete borehole number is B3890R161.
								65.7				0.0 - 1.3 ft: Sandy Silt; Grayish brown (5YR3/2), fine grained, silt -60%, sand -40%, low plasticity, moist.	
SS	2.0	1.8	10 13 18					65.0				2.0 - 3.8 ft: Sludge; Dark gray (N3) with traces of White (N6) areas within the composition, clayey to silty, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
								63.2					
SS	0.3	0.0	50/4*					62.7				TOTAL DEPTH = 4.3 FT.	Augered to 4.0'. Spoon advanced to refusal at 4.3'; hollow wooden sound when hitting spoon. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).													
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE Stepan Property				Last Update: 03-19-92		HOLE NO. R161			



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP		14501	1 OF 1	R162		
SITE			COORDINATES			ANGLE FROM HORIZ BEARING				
Stepan Property			N 9685.0; E 10677.0			Vertical -----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-11-90	10-11-90	Hydro Group, Inc.	Soil Sentry		8"	13.1	1.4	14.5		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
7.7/53*		0	8	NA	67.0	/ NA		13.1/53.9		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.					
SS	2.0	1.5	1 2 4			67.0			0.0 - 8.5 ft: FILL.	Complete borehole number is B3890R162.
SS	2.0	0.8	3 6 4			65.5 65.0 64.2			0.0 - 2.8 ft: Sandy Silt; Moderate brown (5YR3/4), fine to medium grained, no plasticity, brick fragment at 2.8', moist.	
SS	2.0	1.3	2 3 4 3			63.0 61.7	5		4.0 - 6.4 ft: Sludge; conglomeration of Moderate brown (10R4/6) and White (N9) swirled together, changing to Grayish black (N2) with trace of Pinkish Gray (5YR8/1) spots at 4.4', clayey to silty, moist.	
SS	2.0	1.1	3 22 15 11			61.0 59.9			6.4 - 7.1 ft: Sandstone Gravel; Moderate reddish brown (10R4/6), fine to medium grained, blocky, iron-oxide cement.	
SS	2.0	0.5	6 6 10 9			59.0 58.5			8.0 - 8.5 ft: Sludge; Dark reddish brown (10R3/4), swirled with Medium dark gray (N4) bands, clayey to silty, moist to wet.	
SS	2.0	0.7	4 4 3 1			57.0 56.3	10		10.0 - 13.1 ft: Silty CLAY, (CL); Dark gray (N3), very fine grained, medium plasticity, soft wet.	
SS	2.0	1.8	1 3 4 50			55.0 53.9				Augered to 14.0'. Spoon advanced to refusal at 14.5'.
SS	0.5	0.0	50/6"			53.2 52.5			13.1 - 13.8 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), fine grained, some sandstone, wet.	3" PVC casing inserted to 13.0' for gamma-logging.
TOTAL DEPTH = 14.5 FT.									PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
									* Core recovery refers to total rock & soil sample.	
									Ground elevation estimated from site topographic map.	
									Description & classification by visual examination of sample.	
									Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Last Update:		HOLE NO.		
			Stepan Property			03-19-92		R162		



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 1	R163			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
Stepan Property			N 9683.0; E 10800.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-12-90	10-12-90	Hydro Group, Inc.		Soil Sentry		8"	2.0	8.0	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
9.1/91*		0	5	NA	65.0	NA / NA		2.0/63.0			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.3	3 4 5			65.0				0.0 - 1.3 ft: Silty SAND, (SM); Moderate brown (5YR3/4), fine grained, sand -70%, silt -30%, low plasticity, moist.	Complete borehole number is B3890R163.
SS	2.0	2.0	4 14 17 20			63.7 63.0				2.0 - 10.0 ft: Clayey SILT, (ML); Moderate reddish brown (10R4/6), silt -60%, clay -30%, sand -10%, medium plasticity, sandstone cobble at 4.0', and in matrix between 7.5 - 8.0', moist; changing to sandstone at 10.0'. Dark reddish brown (10R3/4), fine grained, blocky, iron-oxide cement, dry.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	8 15 17 18			59.2 59.0	5				
SS	2.0	2.0	15 17 29 50/6"								
SS	2.0	2.0	29 31 40 42								Augered to 8.0'.
						55.0	10			TOTAL DEPTH = 10.0 FT.	Sampled to 10.0'. 3" PVC casing inserted to 6.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update: 03-19-92
HOLE NO. R163



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.							
				FUSRAP		14501	1 OF 1	R164							
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING							
Stepan Property			N 9683.0; E 10850.0			Vertical		-----							
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH							
10-12-90	10-12-90	Hydro Group, Inc.	Soil Sentry		8"	6.0	4.5	10.5							
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK							
9.1/87*		0	6	NA	65.0	NA		6.0/59.0							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:											
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>											
				(Template: MYWD)											
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
SS	2.0	1.7	2	4			65.0				0.0 - 4.4 ft: Silty SAND, (SM); Grayish red (10R4/2) changing to Moderate brown (5YR5/4) at 1.5', fine grained, with sandstone cobbles below 2.0', low plasticity, moist.	Complete borehole number is B3890R164.			
SS	2.0	1.4	6	12			63.3					Borehole sampled and gamma-logged by TMA/Eberline Corp.			
			10	11			63.0								
SS	2.0	2.0	5	11			61.6								
			22	26			61.0								
SS	2.0	2.0	11	40			60.6	5			4.4 - 6.0 ft: Sandy SILT, (ML); Light brown (5YR5/6) changing to Moderate brown (5YR4/4) at 5.1', very fine to fine grained, changing to fine to medium grained at 5.1', some cobbles below 5.1', low plasticity, moist.				
			20	21			59.0				6.0 - 10.4 ft: Sandy SILT and SANDSTONE, (ML); Moderate reddish brown (10R4/6) fine to medium grained, low plasticity, moist; with Sandstone, Dark reddish brown (10R3/4), very fine to fine grained, blocky, iron-oxide cement.				
SS	2.0	1.6	26	14			55.4					Spoon refusal at 10.5'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.			
			25	27			55.0	10							
SS	0.5	0.4	50/6"				54.6								
							54.5				TOTAL DEPTH = 10.5 FT.				
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER															
SITE										Stepan Property		Last Update: 03-19-92		HOLE NO. R164	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R165			
Stepan Property				N 9720.0; E 10657.0		Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-15-90	10-15-90	Hydro Group, Inc.	Soil Sentry		8"	4.0	6.4	10.4			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
7.8/88*		0	6	NA	67.0	V / NA / NA		4.0/63.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD) DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.4	1 17 12 8				67.0		0.0 - 1.0 ft: FILL ; Sandy Silt; Grayish brown (5YR3/2), fine grained, silt -60%, sand -40%, no plasticity, moist; brick fragments between 0.3 - 1.0'.	Complete borehole number is B3890R165.	
SS	2.0	1.5	12 14 nr nr				66.0 65.6 65.0		1.0 - 3.5 ft: Silty SAND, (SM) ; Moderate brown (5YR3/4) changing to Moderate brown (5YR4/4) at 3.0', fine to medium grained, no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	2.0	11 20 34 50				63.5 63.0	5	4.0 - 10.4 ft: Silty SAND, (SM) ; Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 6.0', fine to medium grained, sand -60%, silt -40%, some gravel, sandstone cobble at 7.0'; sand content increasing below 9.0' with color change to Grayish red (10R4/2), medium grained, well sorted, micaceous, moist; changing to sandstone at 9.5', Grayish red (10R4/2), medium grained, well sorted, blocky, iron-oxide cement, moist.	Spoon refusal at 7.0'.	
SS	1.0	1.0	34 50/6"				60.0			Augered to 8.0'.	
SS	1.5	1.5	10 26 50/6"				59.0			Spoon refusal at 9.5'.	
							57.5 57.0 56.6	10		Augered to 10.0'.	
TOTAL DEPTH = 10.4 FT.										Spoon refusal at 10.4'.	
										3" PVC casing inserted to 9.0' for gamma-logging.	
										PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
										nr = not recorded.	
										* Core recovery refers to total rock & soil sample.	
										Ground elevation estimated from site topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER				SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R165	



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R166
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Stepan Property			N 9721.0; E 10680.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-15-90	10-15-90	Hydro Group, Inc.	Soil Sentry	8"	13.0	0.1	13.1			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
7.4/56*		0	7	NA	67.0	NA / NA		13.0/54.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
SS	2.0	1.5	2 8 13 7				67.0			0.0 - 13.0 ft: FILL. 0.0 - 3.2 ft: Sandy Silt; Moderate brown (5YR3/4) changing to Dark reddish brown (10R3/4) at 2.0', fine grained, silt -60%, sand -40%, some sandstone cobbles, moist.	Complete borehole number is B3890R166. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.2	8 13 17 5				65.5 65.0				
SS	2.0	1.3	2 1 3 6				63.8 63.0			4.0 - 13.1 ft: Sludge; Very light gray (N8) to Dark gray (N3), conglomerated mass of swirled color layers, changing to Dark gray (N3) at 8.0'; clayey to silty, moist to wet at 8.0'.	
SS	2.0	0.1	4 4 3 5				61.7 61.0 60.9	5			
SS	2.0	2.0	6 3 4 5				59.0				
SS	2.0	0.2	3 5 5 8				56.8	10			Auger refusal at 13.0', sounded like metal to metal contact.
SS	1.1	1.1	8 8 50/1"				55.0 54.0 53.9				Spoon refusal at 13.1'. 3" PVC casing inserted to 13.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
										13.0 - 13.1 ft: SANDSTONE; Grayish red (10R4/2), hard.	
										TOTAL DEPTH = 13.1 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R166
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R167				
SITE			COORDINATES			ANGLE FROM HORIZ. BEARING						
Stepan Property			N 9770.0; E 10678.0			Vertical -----						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-15-90	10-15-90	Hydro Group, Inc.	Soil Sentry	8"	11.4	2.8	14.2					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
9.1/64*		0	8	NA	67.0	7 / NA 5 / NA		11.0/55.6				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.							TIME IN MIN.	(Template: NYWD)
SS	2.0	1.0	2 20 17 11				67.0				0.0 - 11.4 ft: FILL. 0.0 - 0.5 ft: Topsoil; Sandy Silt; Moderate brown (5YR3/4), fine grained, moist. 0.5 - 4.7 ft: Sandstone Gravel; Dark reddish brown (10R3/4), blocky, iron-oxide cement.	Complete borehole number is B3890R167.
SS	2.0	1.1	49 32 21 11				66.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	12 2 3 6				65.0					
SS	2.0	1.2	1/12" 1 1				63.9					
SS	2.0	1.3	1 1 2 2				63.0					
SS	2.0	1.7	2 2 3 27				61.5	5			4.7 - 11.4 ft: Sludge; Light gray (N7) to Medium gray (N5) to Dark yellowish orange (10YR6/6), conglomerated mass, changing to Dark yellowish orange (10YR6/6) to Light brown (5YR5/6) conglomerated mass at 6.0'; clayey to silty, moist to wet at 6.0'.	
SS	2.0	1.2	1/12" 1 1				61.0					
SS	2.0	1.3	1 1 2 2				59.8					
SS	2.0	1.3	1 1 2 2				59.0					
SS	2.0	1.7	2 2 3 27				57.7					
SS	2.0	1.7	2 2 3 27				57.0	10				
SS	1.6	1.1	2 8 12 50/1"				55.6				11.4 - 14.2 ft: Clayey SILT, (ML); Moderate reddish brown (10R4/6), silt -60%, clay -30%, some sandstone cobbles, low plasticity, moist; changing to sandstone at 14.0', Dark reddish brown (10R3/4), fine to medium grained, micaceous, blocky, iron-oxide cement, moist.	Spoon refusal at 13.6'. Augered to 14.0'. Spoon refusal at 14.2'.
SS	1.6	1.1	2 8 12 50/1"				55.3					
SS	1.6	1.1	2 8 12 50/1"				55.0					
SS	0.2	0.2	50/2"				53.9					3" PVC casing inserted to 13.5' for gamma-logging.
SS	0.2	0.2	50/2"				53.0					PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	0.2	0.2	50/2"				52.8					
TOTAL DEPTH = 14.2 FT.												* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Stepan Property			Last Update: 03-19-92		HOLE NO. R167	



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.
				FUSRAP	14501	1 OF 1	R168
SITE			COORDINATES		ANGLE FROM HORIZ BEARING		
Stepan Property			N 9787.0; E 10884.0		Vertical -----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
10-15-90	10-15-90	Hydro Group, Inc.	Soil Sentry	8"	6.0	1.5	7.5
CORE RECOVERY (FT./X)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
5.0/67*		0	4	NA	64.0	Y / NA N / NA	6.0/58.0
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:			
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.3	3 11 10 7				64.0				0.0 - 4.5 ft: Sandy SILT , (ML); Dusky yellowish brown (10YR2/2) changing to Moderate yellowish brown (10YR5/4) at 1.0' and to Light brown (5YR5/6) at 2.0', fine to coarse grained, silt -60%, sand -30%, some gravel, sandstone cobble at 4.5', dry to moist at 1.0'.	Complete borehole number is B3890R168. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	7 10 12 11			62.7						
SS	1.5	0.5	15 25 50/6"			62.0						
SS	1.5	1.5	15 21 50/6"			60.3 60.0 59.5	5					
SS	1.5	1.5	15 21 50/6"			58.0					6.0 - 7.5 ft: SANDSTONE ; Dark reddish brown (10R3/4), fine grained, micaceous, blocky, iron-oxide cement, moist.	Spoon refusal at 5.5'. Augered to 6.0'.
						56.5					TOTAL DEPTH = 7.5 FT.	Spoon refusal at 7.5'. 3" PVC casing inserted to 5.5' for gamma-logging.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R168
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

SOLE NO.

R169

SITE

Stepan Property

COORDINATES

N 9747.0; E 10884.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-16-90

COMPLETED

10-16-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

3.1

ROCK (FT.)

4.4

TOTAL DEPTH

7.5

CORE RECOVERY (FT./%)

5.4/72*

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

64.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

3.1/60.9

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook *[Signature]*

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLKS. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.T.	TIME MIN.						
SS	2.0	0.8	2 5 3				64.0					
SS	2.0	1.6	3 3 6				63.4				0.0 - 3.1 ft: Sandy SILT, (ML); Moderate brown (5YR3/4), silt -60%, sand -40%, moist.	Complete borehole number is B3890R169.
SS	2.0	1.8	4 8 10 10				62.0				3.1 - 7.4 ft: Sandy SILT and SANDSTONE, (ML); Dark reddish sandstone cobbles between 4.0 - 7.1'; changing to sandstone at 7.1', fine grained, micaceous, iron-oxide cement; moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	4 8 10 10				60.9 60.5 60.0					
SS	1.5	1.4	10 27 50/6"				58.2 58.0					Augered to 6.0'.
							56.6 56.5					Spoon refusal at 7.5'. 3" PVC casing inserted to 5.5' for gamma-logging.
												PVC casing was removed after logging; hole was backfilled with drilling spoils.
												TOTAL DEPTH = 7.5 FT.

(Template: MYWD)

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

Complete borehole number is B3890R169.

Borehole sampled and gamma-logged by TMA/Eberline Corp.

Augered to 6.0'.

Spoon refusal at 7.5'. 3" PVC casing inserted to 5.5' for gamma-logging.

PVC casing was removed after logging; hole was backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

SOLE NO. R169



GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R170**

SITE **Stepan Property** COORDINATES **N 9786.0; E 10750.0** ANGLE FROM HORIZ **Vertical** BEARING **-----**

BEGUN **10-16-90** COMPLETED **10-16-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Mobile B-80** SIZE **8"** OVERBURDEN **0.5** ROCK (FT.) **3.2** TOTAL DEPTH **3.7**

CORE RECOVERY (FT./%) **2.8/76*** CORE BOXES **0** SAMPLES **3** EL. TOP CASING **NA** GROUND EL. **66.0** DEPTH/EL. GROUND WATER **NA** DEPTH/EL. TOP OF ROCK **0.5/65.5**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.4	2	8				66.0				0.0 - 0.5 ft: Sandy SILT, (ML); Moderate brown (5YR3/4), fine grained, silt -60%, sand -40%, moist. 0.5 - 3.7 ft: Gravelly, Sandy SILT, (ML); Moderate reddish brown (10R4/6), fine grained with sandstone cobbles present.	Complete borehole number is B3890R170. Borehole sampled and gamma-logged by TMA/Eberline Corp. Auger refusal at 3.5'. Spoon refusal at 3.7'. 3" PVC casing inserted to 3.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	1.5	1.2	15	17				64.6					
			50/6"					64.0					
SS	0.2	0.2	80/3"					62.8 62.5 62.3					
TOTAL DEPTH = 3.7 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **R170**



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R171**

SITE: **Stapan Property** COORDINATES: **N 9245.0; E 10688.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-16-90** COMPLETED: **10-16-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **10.0** ROCK (FT.): **4.2** TOTAL DEPTH: **14.2**

CORE RECOVERY (FT./%) **10.1/71*** CORE BOXES: **0** SAMPLES: **8** EL. TOP CASING: **NA** GROUND EL.: **57.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **10.0/47.0**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
								57.0				(Template: HYWD)	
SS	1.6	1.1	36					56.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R171.
SS	1.9	1.7	14					55.4				0.5 - 1.6 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6) changing to Grayish black (N2) at 1.2', fine grained, sand -60%, silt -30%, gravel -10%, some sandstone cobbles, pungent solvent odor below 1.2'.	Augered through asphalt to 0.5'.
			17					55.0				2.0 - 3.7 ft: Silty GRAVEL, (GM); Dusky brown (5YR2/2), gravel -40%, silt -40%, sand -20%, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	4					53.3				4.0 - 10.0 ft: Silty SAND, (SM); Dusky yellowish brown (10YR2/2) with 1" thick layer of Medium dark gray (N4) changing to Pale reddish brown (10R5/4) at 8.0' and to Moderate reddish brown (10R4/6) at 8.0', fine to medium grained, sand -60%, silt -40%, moist.	Spoon refusal at 3.9'. Augered to 4.0'.
			8					53.0					
SS	2.0	1.8	6					51.0	5				
			10					49.2					
SS	1.5	1.5	21					49.0					
			27					47.5					
			50/6"					47.0	10				
SS	1.0	1.0	27					46.0				10.0 - 14.2 ft: Silty SAND and SANDSTONE, (SM); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 12.0', fine to medium grained, sand -40-70%, silt -40-50%; with sandstone pebbles and cobbles, micaceous, iron-oxide cement; moist to wet below 12.0 ft.	Spoon refusal at 9.5'. Augered to 10.0'. Spoon refusal at 11.0'. Augered to 12.0'. Spoon refusal at 13.9'. Augered to 14.0'. Spoon and auger refusal at 14.2'.
			50/6"					45.0					
SS	1.9	1.8	18					43.2					
			21					43.0					
			35					42.8					
			50/3"										
												TOTAL DEPTH = 14.2 FT.	3" PVC casing inserted to 13.5' for gamma-logging.
													PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
													* Core recovery refers to total rock & soil sample.
													Ground elevation estimated from site topographic map.
													Description & classification by visual examination of sample.
													Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE

Stapan Property

Last Update: 03-19-92

HOLE NO. R171



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO. 14501

SHEET NO. 1 OF 1

HOLE NO. R172

SITE

Stepan Property

COORDINATES

N 9250.0; E 10828.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN 10-16-90

COMPLETED 10-16-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.0

ROCK (FT.)

10.0

TOTAL DEPTH

14.0

CORE RECOVERY (FT./%)

10.3/74*

CORE BOXES

SAMPLES

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

4.0/53.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
							57.0					
SS	1.6	0.7	7 22 44				56.8 55.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 3.1 ft: Gravely, Sandy SILT, (GM); Moderate brown (10YR4/2) silt -50%, sand -25%, gravel -25%, fine to coarse grained, moist.	Complete borehole number is B3890R172. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	17 27 23 30				55.0 53.9					
SS	2.0	1.9	27 17 18 19				53.0	5			4.0 - 14.0 ft: Sandy SILT, (GM); Dark reddish brown (10R3/4) changing to Grayish red (5R4/2) at 10.0'; fine to medium, subangular to subrounded grains; silt -50-60%, sand -30-50%, some gravel, no plasticity, moist; very pungent solvent smell below 10.0'.	
SS	2.0	1.9	14 11 19 18				51.1 51.0					
SS	0.9	0.9	15 50/3"				49.1 49.0					
							48.1					
SS	1.9	1.9	7 28 34 50/5"				47.0	10				Spoon refusal at 8.9'. Augered to 10.0'. Spoon refusal at 11.9'. Augered to 12.0'. Spoon refusal at 13.9'. Augered to total depth of 14.0'.
SS	1.9	1.9	17 19 23 50/4"				45.1 45.0					
							43.1 43.0					3" PVC casing inserted to 13.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
TOTAL DEPTH = 14.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R172



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R173			
Stepan Property				N 9710.0; E 9905.0		Vertical	-----	-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-17-90	10-17-90	Hydro Group, Inc.		Acker Soil Sentry		8"	9.5	0.0	9.5		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
7.0/74*		0	5	NA	57.0	/ NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in		none		Jon Novick <i>[Signature]</i>							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS % CORE RECOVERY	WATER PRESS. LOSS G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.6	15 12 18 8				57.0			0.0 - 3.9 ft: FILL.	Complete borehole number is B3890R173.
SS	2.0	2.0	9 23 19 10				55.4 55.0			0.0 - 2.5 ft: Clayey Silt; Grayish brown (5YR3/2), fine grained, non-cohesive, some rock fragments up to 1", organic layer at base, dry.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	2 1 3 2				53.1 51.9	5		2.5 - 3.9 ft: Debris; concrete fragments between 2.0 - 2.9', brick fragments between 2.9 - 3.0' and 3.1 - 3.9'; silt layer between 3.0 - 3.1', Black (N1), some clay, organic rich, compacted.	
SS	2.0	1.3	6 7 19 34				51.0 50.7 50.2 49.9 49.7 49.0			3.9 - 6.3 ft: SILT, (ML); Olive black (5Y2/1) changing to Brownish black (5YR2/1) at 6.0', some clay and gravel, compressible, wet to saturated below 6.0'.	
SS	1.2	1.0	16 17 50/3"				48.0 47.5			6.3 - 6.8 ft: Sandy CLAY, (CL); Pale brown (5YR5/2), some gravel, saturated.	Spoon refusal at 9.2'. Auger refusal at 9.5'. 3" PVC casing inserted to 8.0' for gamma-logging.
										6.8 - 7.1 ft: SILT, (ML); Brownish black (5YR2/1), some clay and gravel, compressible, saturated.	PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
										7.1 - 9.0 ft: Sandy CLAY, (CL); Pale brown (5YR5/2), silt content increasing and color change to Moderate brown (5YR4/4 - 3/4) at 8.0'; some gravel, compressible, non-cohesive, saturated.	
										TOTAL DEPTH = 9.5 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R173



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501	1 OF 1	R174					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
Stepan Property			N 9550.0; E 9900.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-17-90	10-17-90	Hydro Group, Inc.		Mobile B-80		8"	10.8	0.2	11.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
7.9/72*		0	6	NA	57.0	V / NA W / NA		10.8/46.2					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Jon Novick <i>[Signature]</i>								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.4	2 2 2 1					57.0				(Template: HYWD)	
								55.6				0.0 - 2.8 ft: FILL; Gravel; Brownish black (5YR2/1), Very light gray (N8) and Olive gray (5Y4/1), subangular, up to 1" in size.	Complete borehole number is B3890R174.
SS	2.0	1.0	2 2 2 2 5					55.0				2.8 - 7.2 ft: Silty CLAY, (CL); Dark yellowish brown (10YR4/2) changing to Olive gray (5Y4/1) at 6.0' and to Moderate yellowish brown (10YR5/4) at 6.3', homogeneous; some gravel up to 1 cm between 6.0 - 6.3'; saturated.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.2	5 1 1 1					53.0				7.2 - 8.5 ft: SILT, (ML); Black (N1), homogeneous, saturated.	
								51.8	5			8.5 - 10.8 ft: SAND, (SW); Dark yellowish brown (10YR4/2), fine to medium grained, friable, trace organics, wet.	
SS	2.0	2.0	1 5 6 9					51.0				10.8 - 11.0 ft: SHALE; Dark reddish brown (10R4/6), fissile.	Spoon refusal at 9.3'. Augered to 10.0'.
SS	1.3	1.3	12 17 50/4"					49.8					
								48.5					
								47.7					
SS	1.0	1.0	14-37 50/0"					47.0	10				
								46.2					
								46.0					
											TOTAL DEPTH = 11.0 FT.		
											Spoon refusal at 11.0'.		
											3" PVC casing inserted to 9.5' for gamma-logging.		
											PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.		
											* Core recovery refers to total rock & soil sample.		
											Ground elevation estimated from site topographic map.		
											Description & classification by visual examination of sample.		
											Colors from "Rock-Color Chart" (GSA, 1948).		
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				Last Update:		HOLE NO.			
				Stepan Property				03-19-92		R174			



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R175

SITE

Stepan Property

COORDINATES

N 9300.0; E 10830.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

COMPLETED

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

9.1

ROCK (FT.)

2.9

TOTAL DEPTH

12.0

CORE RECOVERY (FT./%)

7.8/65%

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

NA

57.0

NA

9.1/47.9

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BL. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
							57.0					
SS	1.3	0.8	12				56.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R175.
			50/4"				56.0				0.5 - 1.0 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2), medium grained, well sorted, sand -70%, silt -30%, moist.	
SS	0.5	0.3	50/6"				55.0				1.0 - 4.5 ft: Gravelly SILT, (ML); Dusky brown (5YR2/2), silt -60%, gravel -20%, sand -20%, pungent solvent smell, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							54.7					
SS	2.0	1.8	9				53.0				4.5 - 4.9 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), fine grained, well sorted, with up to -20% silt, moist.	Spoon refusal at 1.8'. Augered to 2.0'.
			17				52.5				4.9 - 6.3 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2), silt -60%, clay -30%, medium plasticity, resin type texture, moist	
			23				52.1	5			6.3 - 9.1 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2) with some Black (N1) streaks, very fine to fine grained, well sorted, rounded to subrounded grains; solvent odor present, pungent to 7.5', slight odor below; moist to wet at 8.0'.	Spoon refusal at 2.3'; rock in spoon cutter at 2.3'. Augered to 4.0'.
SS	2.0	1.5	9				51.2					
			21				51.0				9.1 - 11.5 ft: SANDSTONE; Dark reddish brown (10R3/4), weathered, fine grained, iron-oxide cement, blocky, micaceous, moist.	Spoon refusal at 11.6'. Augered to total depth of 12.0'. 3" PVC casing inserted to 11.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.
			24				50.7					
			15				49.5					
SS	2.0	1.9	6				49.0					
			15				47.9					
			31				47.1					
SS	1.6	1.5	21				47.0	10				
			26				45.5					
			23				45.0					
			50/1"									
TOTAL DEPTH = 12.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.

R175



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R176
SITE Stepan Property			COORDINATES N 9350.0; E 10831.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 10-17-90	COMPLETED 10-17-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 9.6	ROCK (FT.) 2.4	TOTAL DEPTH 12.0
CORE RECOVERY (FT./%) 8.2/68*		CORE BOXES 0	SAMPLES 7	SEL. TOP CASING NA	GROUND EL. 58.0	DEPTH/EL. GROUND WATER NA		DEPTH/EL. TOP OF ROCK 9.6/48.4
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								58.0			(Template: MYWD)	
SS	0.9	0.7	34	50/5"				57.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R176.
SS	2.0	1.7	9	12				56.8			0.5 - 9.6 ft: Sandy SILT to Silty SAND (ML-SM); Moderate brown (5YR3/4) changing to Dark yellowish brown (10YR4/2) at 2.7', to Moderate yellowish brown (10YR5/4) with Black (N1) streaks at 6.0' and to Dark yellowish brown (10YR4/2) with Grayish black (N2) staining at 8.3'; very fine to fine grains, well sorted, silt -40-70%, sand -30-60%, subrounded gravel <10 up to 30%, no plasticity, moderately dense, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 1.4'. Augered to 2.0'.
SS	2.0	1.5	3	8				56.0				
			12					54.3				
			17					54.0				
			11					52.5	5			
SS	2.0	1.7	8					52.0				
			9					50.3				
			10					50.0				
SS	2.0	2.0	10					48.4				
			15					47.4	10		9.6 - 12.0 ft: Silty CLAY and SANDSTONE; Dark reddish brown (10R3/4), weathered, clay -50%, silt -40%, very hard; sandstone cobbles present, iron-oxide cement, very fine grained, micaceous.	Spoon refusal at 11.0'. Auger refusal at 11.8'.
			23					46.2				
			50/6"					46.0				
SS	0.2	0.0	7	50/6"								
											TOTAL DEPTH = 12.0 FT.	Spoon refusal at 12.0'. 3" PVC casing inserted to 11.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.
												* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R176
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R177

SITE

Stepan Property

COORDINATES

N 9100.0; E 10000.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN

10-17-90

COMPLETED

10-17-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Acker Soil Sentry

SIZE

8"

OVERBURDEN

3.7

ROCK (FT.)

0.3

TOTAL DEPTH

4.0

CORE RECOVERY (FT./%)

3.6/90*

CORE BOXES

0

SAMPLES

2

EL. TOP CASING

NA

GROUND EL.

51.0

DEPTH/EL. GROUND WATER

↓ / NA
↑ / NA

DEPTH/EL. TOP OF ROCK

3.7/47.3

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Jon Novick

SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.6	3		51.0 50.8				0.0 - 0.1 ft: FILL; wood chips.	Complete borehole number is B3890R177. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to total depth of 4.0'. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	2.0	2.0	5		49.4 49.0			0.1 - 3.7 ft: Silty CLAY, (CL) Dusky brown (5YR2/2) to Moderate brown (5YR3/4 - 4/4), with roots, some gravel up to 2", some organics below 2.0', decreasing silt and increasing clay towards base, compressible, dry.		
			6 6 31		47.3 47.0			3.7 - 4.0 ft: SILTSTONE; Moderate brown (5YR4/4), homogeneous, dense.		
									TOTAL DEPTH = 4.0 FT.	

(Template: MYWD)

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R177



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R178					
Stepan Property				N 9400.0; E 10832.0		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-17-90	10-17-90	Hydro Group, Inc.	Mobile B-80		8"	8.8	1.2	10.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
8.1/81*		0	5	NA	58.0	NA		8.8/49.2					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30in		none			Robert Cook <i>[Signature]</i>								
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)	
												DESCRIPTION AND CLASSIFICATION	
SS	1.5	0.9	14	16	14			58.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R178. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
								57.8				0.5 - 4.6 ft: Gravelly to Sandy SILT, (SM); Moderate brown (5YR3/4 to 5YR4/4 below 2.3'), Grayish black (N2) layer between 0.9 - 2.3'; very fine to fine grained, well sorted, silt -40-50%, gravel -40%, sand -20%, sand content increasing to -40% and gravel decreasing to trace below 2.3', no plasticity, moist.	
SS	2.0	1.7	8	6	9			56.6					
								56.0					
SS	2.0	1.8	7	23	30			54.3					
								54.0					
								53.4	5			4.6 - 8.5 ft: GRAVEL, (GW); Dark reddish brown (10R4/6), sandstone, fine grained, blocky; trace sand-mixed interbeds; 1/4" thick Grayish black bands below 7.5'.	
SS	2.0	1.7	50	45	35			52.2					
								52.0					
SS	2.0	2.0	7	35	36			50.3					
								49.5					
								49.2				8.5 - 8.8 ft: Clayey SILT, (ML); Olive gray (5Y4/1), very fine to fine grained, low plasticity, moist.	
								48.0	10			8.8 - 10.0 ft: SANDSTONE; Dark reddish brown (10R4/6), fine grained, micaceous, blocky, iron-oxide cement.	
TOTAL DEPTH = 10.0 FT.												Augered to total depth of 10.0'. 3" PVC casing inserted to 9.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.	
SS = SPLIT SPOON; NQ = CORE BARREL; SX = HAND AUGER; O = OTHER												* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SITE						Last Update:		HOLE NO.					
Stepan Property						03-19-92		R178					



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R179				
Stepan Property				N 9453.0; E 11001.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-18-90	10-18-90	Hydro Group, Inc.	Mobile B-80		8"	4.0	0.0	4.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.5/88*		0	2	NA	57.0	/ NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140 lbs/30 in		none		Robert Cook								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							57.0				(Template: MYWD)	
SS	1.5	1.5	12				56.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R179.
			27				56.5				0.5 - 4.0 ft: FILL; Sandy Silt; Pale reddish brown (10R5/4) with trace Dusky brown (5YR2/2) bands changing to Dusky brown (5YR2/2) at 2.0', fine grained, sandstone cobbles present, gravel < 10%, 10% coal intermingled throughout, no plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	7				53.0				TOTAL DEPTH = 4.0 FT.	Hole terminated by TMA/Eberline Corp. 3" PVC casing inserted to 3.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
			21									
			28									
			34									
* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property			Last Update: 03-19-92		HOLE NO. R179	



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R180
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9450.0; E 11051.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-18-90	10-18-90	Hydro Group, Inc.	Mobile B-80		8"	14.4	1.6	16.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
11.5/72*		0	8	NA	57.0	NA / NA		14.4/42.6		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								57.0				(Template: MYWD)	
SS	1.5	1.4	4	99				56.8 56.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R180.
SS	2.0	1.5	3	78				55.1 55.0				0.5 - 5.2 ft: FILL; Gravelly, Sandy Silt; Grayish red (10R4/2), fine grained, silt -50-60%, sand -20-30%, gravel -15-20%, moist; layer of coal, Grayish black (N2) between 2.8 - 3.5', with gravel - 15%.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	2	23				53.5 53.0					
SS	2.0	1.8	3	616				51.8 51.4	5			5.2 - 8.7 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Dark yellowish brown (10YR4/2) at 6.7' and to Dark reddish brown (10R3/4) at 7.2'; very fine grained; silt -70%, clay -20-30%, sand <10-10%, sandstone cobbles present below 7.2', low to medium plasticity, moist	
SS	2.0	1.7	12	1634				49.2 49.0 48.3					
SS	2.0	1.3	8	1728				47.3 47.0	10			8.7 - 10.8 ft: Silty CLAY, (CL); Dark yellowish brown (10YR4/2), very fine grained, clay -70%, silt -30%, medium plasticity, moist banding present between 10.0 - 10.8'; moist to wet.	Spoon refusal at 13.7'.
SS	1.7	1.4	4	1719				46.2 45.7				10.8 - 12.2 ft: SAND, (SP); Grayish black (N2); fine to medium, angular to subrounded grains; well sorted, no plasticity, saturated.	Augered to 14.0'. Spoon refusal at 15.0'.
SS	1.0	0.8	36	50/6"				45.0 44.8 44.0 43.6				12.2 - 13.0 ft: GRAVEL, (GP); Dark reddish brown (10R3/4), sandstone, fine to medium grained, blocky, iron-oxide cement.	Augered to total depth of 16.0'.
								43.0 42.6 42.2	15			13.0 - 13.4 ft: Silty SAND, (SM); Grayish black (N2), very fine to medium, angular to subangular grains, well sorted, saturated.	3" PVC casing inserted to 14.0' for gamma-logging.
								41.0				14.0 - 14.4 ft: Silty CLAY, (CL); Dark yellowish brown (10YR4/2), with banding, layers 1/8" thick; very fine grained, medium plasticity, saturated.	PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
												14.4 - 14.8 ft: SANDSTONE, Dark reddish brown (10R3/4); medium to coarse, subrounded to subangular grains, iron-oxide cement, blocky.	
TOTAL DEPTH = 16.0 FT.													
* Core recovery refers to total rock & soil sample.													
Ground elevation estimated from site topographic map.													
Description & classification by visual examination of sample.													
Colors from "Rock-Color Chart" (GSA, 1948).													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R180
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R181				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
Stepan Property			N 9450.0; E 11095.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-18-90	10-18-90	Hydro Group, Inc.	Mobile B-80		8"	10.0	3.0	13.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
8.1/62*		0	7	NA	57.0	NA		10.0/47.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BL. OLS	% CORE RECOVERY	LOSS IN G.P.H.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											(Template: NYWD)	
SS	1.5	1.1	11				57.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R181. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 7.9'. Augered to 8.0'. Spoon refusal at 9.0'. Augered to 10.0'. Spoon refusal at 10.5'. Augered to 12.0'. Spoon refusal at 13.0'. 3" PVC casing inserted to 11.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			20				56.8				0.5 - 5.0 ft: FILL.	
			19				55.4				0.0 - 2.4 ft: Silty Sand; Grayish red (10R4/2), very fine to medium grains, no plasticity, dry.	
SS	2.0	1.8	5				55.0				2.4 - 3.2 ft: Coal; Grayish black (N2), fine to coarse grains, moist.	
			5				53.2				3.2 - 5.0 ft: Clayey Gravel; mixture of Moderate reddish brown (10R3/4), Pale yellowish brown (10YR6/2) and Moderate brown (5YR4/4) changing to Light brown (5YR5/6) at 4.4; fine to coarse, angular, with some elongated grains, coal <5%, moist.	
			8				53.0					
			13				52.0	5				
SS	2.0	1.5	2				51.5				5.0 - 5.5 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2), very fine grained, medium plasticity, moist.	
			3				51.0				6.0 - 6.4 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), moist.	
			3				50.6				6.4 - 6.9 ft: Silty CLAY, (CL); Dark yellowish brown (10YR4/2), moist.	
			4				50.1				6.9 - 7.9 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2) with Grayish black (N2) banding, moist; sandstone cobble, Dark reddish brown (10R3/4) between 6.9 - 7.2'.	
SS	1.9	1.9	6				49.1				8.0 - 8.5 ft: SAND, (SW); Grayish brown (5YR3/2), angular to subangular grains, saturated.	
			12				49.0				10.0 - 12.8 ft: SANDSTONE, Dark reddish brown (10R3/4), very fine to fine grains, blocky, iron-oxide cement.	
			23				48.5					
			50/5"				47.0	10				
SS	1.0	0.5	8				46.5					
			50/6"				45.0					
							44.2					
							44.0					
TOTAL DEPTH = 13.0 FT.												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER												
SITE												
Stepan Property												
Last Update: 03-19-92												
HOLE NO. R181												



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R182**

SITE: **Stepan Property** COORDINATES: **N 9451.0; E 10857.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-19-90** COMPLETED: **10-19-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **4.7** ROCK (FT.): **0.0** TOTAL DEPTH: **4.7**

CORE RECOVERY (FT./%): **2.4/51*** CORE BOXES: **0** SAMPLES: **3** EL. TOP CASING: **NA** GROUND EL.: **58.0** DEPTH/EL. GROUND WATER: **NA/NA** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLINDS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								58.0				(Template: MYW)	
SS	1.5	0.7		40 38 30				57.8 57.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R182.
SS	1.3	1.0		6 17 50/4*				56.8 56.0				0.5 - 4.7 ft: FILL; Silty SAND; Grayish brown (5YR3/2) changing to Dusky yellowish brown (10YR2/2) at 2.2' and to Dark yellowish brown (10YR4/2) at 4.0'; fine, rounded to subrounded grains; sand -50-70%, silt -30%, gravel -20%, some metal fragments, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
								55.0					
SS	0.7	0.7	nr					54.0					Spoon refusal at 3.3'. Augered to 4.0'. Hit water line at 4.7', hole terminated.
								53.3					3" PVC casing inserted to 3.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.
TOTAL DEPTH = 4.7 FT.													

nr = not recorded.
* Core recovery refers to total rock & soil sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE: **Stepan Property** Last Update: **03-19-92**

HOLE NO.: **R182**



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.			
Stepan Property				N 9447.0; E 10900.0			14501	1 OF 1	R183			
BEGUN		COMPLETED		DRILLER			DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
10-22-90		10-22-90		Hydro Group, Inc.			Mobile B-80	8"	8.4	2.6	11.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
8.9/81*		0	6	NA	58.0	V / NA / NA		8.4/49.6				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							58.0					
							57.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R183.
SS	1.5	1.0	25	31	33		56.5				0.5 - 4.3 ft: FILL.	Augered through asphalt to 0.5'.
							56.0				0.5 - 2.2 ft: Gravelly Sand; Olive gray (5Y4/1) changing to Brownish black (5YR2/1) at 2.0, well graded, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	11	7	10	8					2.2 - 2.7 ft: Silty Sand; Moderate brown (5YR4/4).	
							54.4				2.7 - 4.3 ft: Gravelly to Clayey Silt; Moderate brown (5YR3/4), increased gravel content with depth, trace coal, moist.	
SS	2.0	1.9	3	1	3	13					4.3 - 7.4 ft: Clayey SILT, (ML); Olive gray (5Y4/1) with Dark gray (N3) bands, silt -60%, clay -40%, medium plasticity, moist.	
							52.1					
SS	2.0	2.0	11	13	23	30					7.4 - 8.4 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2), silt -60%, sand -30%, some sandstone cobbles, moist.	
							50.6					
SS	1.4	1.4	13	22	50/5"						8.4 - 11.0 ft: Gravelly, Sandy SILT, (ML); Dark reddish brown (10R3/4), silt -70%, sand -30%, with sandstone cobbles, low plasticity, moist.	
							49.6					
							48.8					
SS	1.0	1.0	19	50/6"			48.0	10				Spoon refusal at 9.4'. Augered to 10.0'. Spoon refusal at 11.0'.
							47.0					Augered to total depth of 11.0'.
												3" PVC casing inserted to 10.5' for gamma-logging.
												PVC casing was removed after logging; hole was backfilled with drilling spoils.
												* Core recovery refers to total rock & soil sample.
												Ground elevation estimated from site topographic map.
												Description & classification by visual examination of sample.
												Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Stepan Property			Last Update: 03-19-92		HOLE NO. R183	



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R184
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9450.0; E 10950.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-22-90	10-22-90	Hydro Group, Inc.	Mobile B-80		8"	8.9	3.1	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
7.1/59*		0	6	NA	58.0	NA		8.9/49.1		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								58.0					
								57.7				0.0 - 1.0 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R184.
SS	1.0	0.9	7	10				57.0				1.0 - 4.7 ft: FILL.	
SS	1.0	0.5	17	50/6"				56.1				1.0 - 2.5 ft: Gravel; Moderate brown (5YR3/4) changing to Dark reddish brown (10R3/4) at 2.9', well graded, with concrete fragments, dry.	Augered through asphalt to 1.0'.
								56.0				4.0 - 4.3 ft: Silty Sand; Grayish red (10R4/2), low plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
								55.5				4.3 - 4.7 ft: Gravel; Light brown (5YR5/6) to Grayish black (N2) with coal -10-20%.	Spoon refusal at 3.0'.
SS	2.0	2.0	2	1				54.0				4.7 - 5.3 ft: Silty CLAY, (CL); Moderate brown (5YR3/4), medium plasticity, moist.	Augered to 4.0'.
								53.3				5.3 - 8.9 ft: Sandy to Clayey SILT, (ML); Light brown (5YR5/6) changing to Moderate brown (5YR4/4) at 8.0'; silt -70%, sand -10-30%, clay -10-30%, gradational increase of clay and decrease of sand content with depth; low to medium plasticity, plasticity increasing with clay content; moist to wet; layer of sand between 8.8 - 8.9', medium rounded to subangular grains, silt <10%.	
								52.7	5				
SS	2.0	0.3	4	8				51.7					
								50.0					
SS	2.0	2.0	6	17				49.1					
								46.6					
SS	2.0	1.4	25	28				46.0	10				
								46.0					
TOTAL DEPTH = 12.0 FT.												Augered to total depth of 12.0'.	
												3" PVC casing inserted to 10.0' for gamma-logging.	
												PVC casing was removed after logging; hole was backfilled with drilling spoils.	
												* Core recovery refers to total rock & soil sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R184



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
Stepan Property				FUSRAP		14501	1 OF 1	R185				
SITE			COORDINATES			ANGLE FROM HORIZ/BEARING						
Stepan Property			N 9307.0; E 11093.0			Vertical -----						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-22-90	10-22-90	Hydro Group, Inc.	Mobile B-80		8"	14.0	0.0	14.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
9.4/67*		0	7	NA	56.0	NA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							56.0				(Template: MYWD)	
							55.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	<p>Complete borehole number is B3890R185.</p> <p>Augered through asphalt to 0.5'.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Augered to total depth of 14.0'.</p> <p>3" PVC casing inserted to 13.0' for gamma-logging.</p> <p>PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.</p> <p>* Core recovery refers to total rock & soil sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>
SS	1.5	0.8	5 4 6				54.7				0.5 - 4.6 ft: FILL, Sandy SILT; Moderate brown (5YR3/4), fine grained, silt -60%, sand -40%, concrete fragments below 3.1', no plasticity, moist.	
SS	2.0	1.4	1 3 12 16				54.0					
							52.6					
SS	2.0	0.8	4 2 2 7				52.0					
							51.4					
							51.2	5			4.6 - 8.8 ft: Sandy to Clayey SILT, (ML); Moderate brown (5YR3/4), fine grained, silt -60%, sand and clay -40%; clay content increasing and color change to Olive gray (5Y4/1) mixed with Grayish black (N2) at 7.0'; sand content increasing and color change to Moderate brown (5YR3/4) at 7.3'; fine grained; clay content increasing and color change to Grayish black (N2) at 8.5'; low plasticity, moist.	
SS	2.0	1.9	8 6 4 7				50.0					
SS	2.0	1.3	8 7 4 9				48.1					
							48.0					
							47.2					
							46.7				8.8 - 9.3 ft: Clayey GRAVEL, (GC); Brownish black (5YR2/1), fine to coarse grained, no plasticity, moist.	
SS	2.0	1.7	4 17 28 33				46.0	10				
							44.6				10.0 - 11.4 ft: Silty SAND, (SM); Olive gray (5Y4/1) changing to Moderate brown (5YR4/4) at 10.4', fine grained, well sorted, sand -60-80%, silt -20-40%, no plasticity, moist.	
							44.3					
SS	2.0	1.5	17 19 25 50				44.0					
							42.7				11.4 - 11.7 ft: Silty CLAY, (CL); Moderate yellowish brown (10YR5/4), very fine grained, low plasticity, moist.	
							42.5				12.0 - 13.3 ft: Silty SAND, (SM); Moderate brown (5YR4/4), very fine to coarse grained, well graded, no plasticity, moist.	
							42.0				13.3 - 13.5 ft: Silty CLAY, (CL); Moderate yellowish brown (10YR5/4), very fine grained, low plasticity, moist.	
TOTAL DEPTH = 14.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R185



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501	1 OF 1	R186					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
Stepan Property			N 9350.0; E 11095.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-23-90	10-23-90	Hydro Group, Inc.	Mobile B-80		8"	12.8	1.2	14.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
11.8/84*		0	5	NA	56.0	V / NA / NA		12.8/43.2					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.F.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
								56.0					
								55.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R186.
SS	1.5	1.1	16	9				54.4				0.5 - 1.6 ft: FILL; Gravel, Moderate brown (5YR3/4), well graded, brick and cement fragments, moist.	Augered through asphalt to 0.5'.
			9	11				54.0				2.0 - 10.5 ft: Sandy to Clayey SILT, (ML); Dark reddish brown (10R3/4) changing to Very dusky red (10R2/2) at 5.1', to Grayish brown (5YR3/2) at 5.6', to Dark reddish brown (10R3/4) at 6.0', to Dark yellowish brown (10YR4/2) at 6.5', to Brownish black (5Y2/1) at 7.7', to Very dusky red (10R2/2) at 8.0' and to Olive black (5Y2/1) at 8.4'; very fine grained, silt -60-70%, clay and sand -30-40%; sandy between 2.0 - 5.6', 6.0 - 6.5' and 8.0 - 8.4', clayey elsewhere; no to low plasticity to 8.4', medium plasticity below; moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			16	24				52.5					
			24	26				52.0					
			30										
			5	7									
			9	10									
			10					48.2					
			3	10				48.0					
			11	24									
			24										
			18	22									
			22	25									
			20										
			21	35									
			50/6"										
								45.5				10.5 - 11.8 ft: Silty SAND, (SM); Moderate brown (5YR4/4); fine to medium, subrounded to subangular grains; sand -70%, silt -30%, moist.	Spoon refusal at 13.5'.
								44.2				11.8 - 12.8 ft: Clayey SILT, (ML); Light brown (5YR5/6) with banding changing to Dusky brown (5YR2/2) at 12.0'; silt -60%, clay -40%, medium plasticity.	Augered to total depth of 14.0'.
								43.2				12.8 - 13.4 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, iron-oxide cement, blocky, moist.	3" PVC casing inserted to 12.5' for gamma-logging.
								42.6					
								42.0					
TOTAL DEPTH = 14.0 FT.												PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
												* Core recovery refers to total rock & soil sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER													
SITE													
Stepan Property													
Last Update: 03-19-92												HOLE NO. R186	



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R187	
SITE Stepan Property		COORDINATES N 9400.0; E 11095.0			ANGLE FROM HORIZ Vertical	BEARING -----	
BEGUN 10-23-90	COMPLETED 10-23-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 17.0	ROCK (FT.) 1.0	
CORE RECOVERY (FT./%) 13.1/73*		CORE BOXES 0	SAMPLES 10	EL. TOP CASING NA	GROUND EL. 57.0	DEPTH/EL. GROUND WATER 17.0/40.0	TOTAL DEPTH 18.0
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							57.0				(Template: MYLD)	
SS	1.5	1.1	8 20 9				56.8 55.4 55.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 16.0 ft: FILL. 0.5 - 1.6 ft: Clayey Silt; Grayish brown (5YR3/2), fine grained, silt -70%, clay -30%, some gravel, no plasticity, moist. 2.0 - 4.7 ft: Sandy Silt; Grayish red (10R4/2), fine grained, silt -70%, sand -30%, some gravel, no plasticity, moist.	Complete borehole number is B3890R187. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	14 16 12 10				53.5 53.0				4.7 - 16.0 ft: Sludge; conglomerated mix of White (N9) to Dark gray (N3), clayey, fine grained, medium plasticity, moist.	
SS	2.0	1.7	8 4 6 7				51.4 51.0 50.6	5				
SS	2.0	0.4	3 2 3 3				49.0					
SS	2.0	1.8	3 1 2 1				47.2 47.0	10				Spoon refusal at 17.0'. Augered to 17.0'. Spoon refusal at 17.8'. Augered to total depth of 18.0'. 3" PVC casing inserted to 15.0' for gamma-logging.
SS	2.0	1.8	1 1/12" 1 1				45.2 45.0					
SS	2.0	2.0	1 1/12" 1 2				41.0	15				PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	2.0	2.0	9 30 31 50				40.0					
SS	1.0	0.0	nr				39.2 39.0				17.0 - 17.8 ft: SANDSTONE; Dark reddish brown (10R3/4), Blocky, iron-oxide cement, moist.	nr = not recorded. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	0.8	0.8	40 50/4"								TOTAL DEPTH = 18.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R187
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R188
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9410.0; E 11095.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-24-90	10-24-90	Hydro Group, Inc.	Mobile B-80	8"	13.0	3.0	16.0			
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK				
10.3/64*	0	8	NA	57.0	NA / NA	13.0/44.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
							57.0				
SS	1.5	1.2	10 13 12				56.8 56.5			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R188. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	7 4 11 12				55.3 55.0			0.5 - 13.0 ft: FILL. 0.5 - 3.4 ft: Silty Sand; Moderate brown (5YR3/4), very fine to coarse grained, well graded, some gravel, moist.	
SS	2.0	1.3	6 7 5 4				53.2 53.0			3.4 - 3.5 ft: Sludge; White (N9) to Dark gray (N3) conglomerated mix, clayey, moist. 3.6 - 4.8 ft: Clayey Silt; Grayish black (N2) changing to Grayish brown (5YR3/2) at 4.0', silt -70%, clay -30%, no plasticity.	
SS	2.0	0.9	2 3 3 2				51.7 51.0	5		4.8 - 5.3 ft: Sand; Blackish red (5R2/2); fine to coarse, rounded to subangular grains; moist.	
SS	2.0	0.9	2 2 2 1				50.1 49.0			6.0 - 13.0 ft: Sludge; White (N9) to Dark gray (N3) conglomerated mix, clayey with sand, low plasticity, moist.	
SS	2.0	1.0	2 1 1 1				48.1 47.0	10			
SS	2.0	1.8	1 28 40 32				45.0 44.0				
SS	2.0	1.4	28 17 19 20				43.2 43.0			13.0 - 15.4 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), very fine grained, silt -80%, clay -20%, very stiff.	
							41.6 41.0	15			
TOTAL DEPTH = 16.0 FT.										Augered to total depth of 16.0'. 3" PVC casing inserted to 14.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R188
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R189				
Stepan Property				N 9420.0; E 11095.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-24-90	10-24-90	Hydro Group, Inc.	Mobile B-80		8"	9.0	2.0	11.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.4/67*		0	7	NA	57.0	V / NA		9.0/48.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.							TIME IN MIN.
							57.0					
SS	1.5	1.3	11				56.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R189. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 9.5'. Augered to 10.0'. Spoon refusal at 10.5'. Additional spoon attempted; refusal at 11.0'. Augered to total depth of 11.0'. 3" PVC casing inserted to 10.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			13				55.2				0.5 - 6.3 ft: FILL; Sandy Silt; Moderate brown (5YR3/4) changing to Moderate reddish brown (10R4/6) at 0.9', to Grayish black (N2) at 3.5' and to Dusky brown (5YR2/2) at 4.0'; very fine to coarse grained, silt -70%, sand -20%, coal -10%, minor gravel, no plasticity, moist.	
			16				55.0					
SS	2.0	1.7	22				53.3				6.3 - 6.7 ft: Clayey SILT, (ML); Moderate brown (5YR4/4), fine grained, silt -70%, clay -30%, low plasticity, moist.	
			11				53.0				6.7 - 6.8 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), sandstone, blocky.	
			10				51.9	5			8.0 - 9.0 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), very fine to fine grained, well sorted, sand -60%, silt -40%, moist.	
			34				51.0					
			7				50.7					
			7				50.3					
			7				50.2					
SS	1.5	1.5	10				49.0					
			14				48.0					
			50/6"				47.5					
							47.0	10				
SS	0.5	0.5	50/6"				46.0				9.0 - 11.0 ft: Clayey SILT, (ML); Moderate reddish brown (10R4/6), mottled; very fine grained, silt -60%, clay -40%, stiff, moist; changing to sandstone at 10.0', Dark reddish brown (10R3/4), micaceous, blocky, iron-oxide cement.	
SS	0.5	0.5	50/6"									
TOTAL DEPTH = 11.0 FT.												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER												
SITE								Stepan Property		Last Update: 03-19-92		HOLE NO. R189



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R190
SITE Stepan Property			COORDINATES N 9430.0; E 11095.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 10-24-90	COMPLETED 10-24-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 8.6	ROCK (FT.) 2.4	TOTAL DEPTH 11.0
CORE RECOVERY (FT./%) 6.4/58*		CORE BOXES 0	SAMPLES 6	EL. TOP CASING NA	GROUND EL. 57.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK 8.6/48.4
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLKS. / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							57.0				(Template: MYMD)	
							56.8 56.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 5.5 ft: FILL.	Complete borehole number is B3890R190.
SS	1.5	1.2	14 13 11				55.3 55.0				0.5 - 2.3 ft: Silty Sand; Dark reddish brown (10R3/4), fine to coarse grained, sand -70%, silt -30%, some gravel, no plasticity.	Augered through asphalt to 0.5'.
SS	2.0	1.8	4 5 4 8				53.2 53.0				2.3 - 4.6 ft: Silty Gravel; Dusky yellowish brown (10YR2/2) changing to Moderate yellowish brown (10YR5/4) at 3.0' and to Dusky brown (5YR2/2) at 3.4', fine to coarse grained.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	5 5 24 22				51.5	5			4.6 - 5.0 ft: Clayey Silt; Moderate brown (5YR4/4), very fine grained, silt -70%, clay -30%, medium plasticity, moist.	
SS	2.0	0.0	4 4 11 13				49.0				5.0 - 5.5 ft: Clayey Gravel; Moderate brown (5YR3/4), with coal -15%, moist.	6.0 to 8.0' - no recovery due to lack of core catcher in split spoon; suspected wet gravel fell from sampler.
SS	2.0	1.6	6 9 11 35				48.4				8.0 - 8.6 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2), fine grained, well sorted, sand -80%, silt -20%, no plasticity, moist.	
SS	0.3	0.3	50/4"				47.4 47.0 46.7	10			8.6 - 10.3 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), silt -60%, sand -40%, micaceous, no plasticity, moist.	Spoon refusal at 10.3'.
							46.0				TOTAL DEPTH = 11.0 FT.	Augered to total depth of 11.0'. 3" PVC casing inserted to 10.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
 HX = HAND AUGER; O = OTHER

Stepan Property

Last Update: 03-19-92 HOLE NO. **R190**



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501	1 OF 1	R191					
SITE			COORDINATES			ANGLE FROM HORIZ BEARING							
Stepan Property			N 9446.0; E 10850.0			Vertical -----							
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-25-90	10-25-90	Hydro Group, Inc.		Mobile B-80	8"	11.1	2.9	14.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
9.2/66*		0	7	NA	58.0	/ NA		11.1/46.9					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	1.5	1.0	15					58.0					
			26					57.8					
			16					56.5					
SS	2.0	1.7	7					56.0					
			8					54.3					
			13					54.0					
			10										
SS	2.0	1.9	7										
			6					52.1					
			7										
			9										
SS	2.0	0.0	6										
			11					50.0					
			12										
			13										
SS	2.0	1.8	6										
			9					48.7					
			11					48.2					
			18					48.0					
SS	2.0	1.7	4					47.3					
			6					46.9					
			21					46.3					
			34					46.0					
SS	1.5	1.1	19					44.9					
			31										
			50/6"										
								44.0					
TOTAL DEPTH = 14.0 FT.													
												<p>Complete borehole number is B3890R191.</p> <p>Augered through asphalt to 0.5'.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>No sample recovered between 6.0 - 8.0'.</p> <p>Spoon refusal at 13.5'.</p> <p>Augered to total depth of 14.0'.</p> <p>3" PVC casing inserted to 14.0' for gamma-logging.</p> <p>PVC casing was removed after logging; hole was backfilled with drilling spoils.</p> <p>* Core recovery refers to total rock & soil sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Last Update:			HOLE NO.				
			Stepan Property			03-19-92			R191				



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 1	R192			
SITE			COORDINATES			ANGLE FROM HORIZ BEARING					
Stepan Property			N 9350.0; E 10644.0			Vertical -----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-25-90	10-25-90	Hydro Group, Inc.	Mobile B-80		8"	6.1	3.9	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.8/68*		0	5	NA	57.0	/ NA		6.1/50.8			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						
SAMP TYPE SAND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS LN G.P.M	PRESS. P.S.I.	TIME MIN.					
SS	1.5	1.0	6 5 6				57.0 56.8 56.3		0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R192. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.1	1 4 4				55.5 55.0		0.2 - 0.7 ft: GRAVEL (GP); with sand. 0.7 - 3.1 ft: SAND, (SP); Grayish orange (10YR4/1), fine grained, well sorted, dry.		
SS	2.0	1.8	2 6 8 12				53.9 53.0		4.0 - 6.1 ft: Sandy SILT, (ML); Moderate brown (5YR4/4), trace mottling; silt -70%, sand -30%, low plasticity, moist.		
SS	2.0	1.2	12 20 18 27				51.2 51.0 50.8		6.1 - 9.7 ft: Clayey SILT, (ML); Dark reddish brown (10YR3/4), silt -70%, clay -30%, low plasticity, moist; changing to sandstone at 7.2', micaceous, blocky, iron-oxide cement.		
SS	2.0	1.7	30 32 25 20				49.8 49.0				
							47.3 47.0	10	TOTAL DEPTH = 10.0 FT.		Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R192	



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R193
SITE Stepan Property		COORDINATES N 9480.0; E 11095.0			ANGLE FROM HORIZ. BEARING Vertical	
BEGUN 10-25-90	COMPLETED 10-25-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 6.0	ROCK (FT.) 4.0
CORE RECOVERY (FT./%) 6.6/66*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 57.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
							57.0			(Template: MYWD)	
SS	1.5	1.3	4				56.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R193.
SS	2.0	0.6	5				55.2 55.0 54.8 54.4			0.5 - 2.2 ft: FILL; Sandy SILT; Moderate brown (5YR3/4), silt -70%, sand -30%; with coal and slag, Black (N1), below 1.2'.	Augered through asphalt to 0.5'.
SS	2.0	1.7	4 12 18 21				53.0			2.2 - 5.7 ft: Sandy SILT, (ML); Moderate brown (5YR4/4), fine grained, silt -70%, sand -30%, low plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.0	1.0	19 50/6"				51.3 51.0			6.0 - 10.0 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 7.0', very fine to fine grained, silt -60%, sand -40%, some sandstone cobbles.	Spoon refusal at 7.0'.
SS	2.0	2.0	17 20 23 21				49.0				Augered to 8.0'.
							47.0	10		TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R193
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R194
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9497.0; E 11095.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-26-90	10-26-90	Hydro Group, Inc.	Mobile B-80	8"	4.7	7.3	12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
8.9/74*		0	6	NA	57.0	/ NA		4.7/52.3		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS	G.P.M.	PRESS. P.S.F.							TIME MIN.
								57.0				(Template: MYWD)	
SS	1.5	0.8	5	2				58.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R194. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Auger refusal at 12.0'. 3" PVC casing inserted to 11.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			2	4				55.7				0.5 - 1.3 ft: FILL; Gravel; Dark yellowish brown (10YR4/2); with coal, Grayish black (N2), below 0.7'.	
SS	2.0	1.3	2	4				55.0				2.0 - 4.7 ft: Clayey SILT, (ML); Grayish red (5R4/2), silt -60%, clay -40%, very fine to fine grained, medium plasticity, moist.	
			3	5				53.7					
SS	2.0	1.9	2	8				53.0					
			14	19				52.3	5			4.7 - 11.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), mottled below 10.0'; silt -70%, sand -20%, clay -10%, fine to medium grained, low plasticity, moist to wet at 8.0'.	
SS	2.0	1.9	4	11				51.1					
			11	14				51.0					
SS	2.0	1.4	9	11				49.1					
			12	20				49.0					
SS	2.0	1.6	9	14				47.6					
			42	40				47.0	10				
								45.4					
								45.0					
TOTAL DEPTH = 12.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R194
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GEOLOGIC DRILL LOG				PROJECT				JOB NO.	SHEET NO.	HOLE NO.		
Stepan Property				FUSRAP				14501	1 OF 1	R195		
SITE				COORDINATES				ANGLE FROM HORIZ		BEARING		
				N 9497.0; E 11087.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-29-90	10-29-90	Hydro Group, Inc.		Mobile B-80		8"	4.0	0.0	4.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.0/75*		0	2	NA	57.0	NA NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Robert Cook						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
						57.0				(Template: MYWD)		
SS	1.5	1.1	7 8 9			56.8 56.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R195.	
SS	1.9	1.9	4 4 3 50/5"			55.4 55.0 54.3				0.5 - 2.7 ft: FILL; Sandy Silt; Pale yellowish brown (10YR6/2), fine to medium grained, some sandstone cobbles; with coal and slag, Grayish black (N2), vitreous sheen, below 0.8'.	Augered through asphalt to 0.5'.	
						53.1 53.0				2.7 - 3.9 ft: Sandy SILT, (ML); Moderate brown (5YR4/4), fine to medium grained, silt -60%, sand -40%, no plasticity.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
										TOTAL DEPTH = 4.0 FT.	Spoon refusal at 3.9'. Augered to total depth of 4.0'. 3" PVC casing inserted to 3.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.	
											* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update: 03-19-92
HOLE NO. R195



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE										COORDINATES		14501	1 OF 1	R196					
Stepan Property										N 9463.0; E 11000.0		ANGLE FROM HORIZ		BEARING					
BEGUN										DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-29-90										10-29-90		Hydro Group, Inc.		Mobile B-80		8"	2.5	0.0	2.5
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		SEL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK							
1.7/68*		0		2		NA		56.0		/ NA		/ NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH					LOGGED BY:											
140 lbs/30 in			none					Robert Cook											
										(Template: MYWD)									
										DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.							
										ELEV.									
										DEPTH									
										GRAPHICS									
										SAMPLE									
										56.0									
										55.8									
										55.5									
										54.3									
										54.0									
										53.5									
										0.0 - 0.5 ft: ASPHALT; over sand and gravel.		Complete borehole number is B3890R196.							
										0.5 - 2.5 ft: FILL.		Augered through asphalt to 0.5'.							
										0.5 - 1.5 ft: Gravelly Clay, Grayish black (N2), with coal and slag below 0.9'.		Borehole sampled and gamma-logged by TMA/Eberline Corp.							
										1.5 - 2.5 ft: Clayey Silt; Moderate brown (5YR3/4), fine grained, silt -70%, clay -20%, sand -10%, no plasticity, moist.		Hole terminated at 2.5'; hard bounce with spoon, possibly metal contact.							
										TOTAL DEPTH = 2.5 FT.		Gamma-logging conducted in open borehole.							
												hole was backfilled with grout and drilling spoils.							
												* Core recovery refers to total rock & soil sample.							
												Ground elevation estimated from site topographic map.							
												Description & classification by visual examination of sample.							
												Colors from "Rock-Color Chart" (GSA, 1948).							
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER										SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R196			



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R197**

SITE: **Stepan Property** COORDINATES: **N 9463.0; E 11010.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-29-90** COMPLETED: **10-29-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **10.8** ROCK (FT.): **1.2** TOTAL DEPTH: **12.0**

CORE RECOVERY (FT./%): **10.6/88*** CORE BOXES: **0** SAMPLES: **7** SEL. TOP CASING: **NA** GROUND EL.: **58.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **10.8/47.2**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS	% CORE RECOVERY	LOSS	PREP. LOSS	WATER LOSS	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
										58.0				
SS	1.5	1.3	11							57.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R197.
			23							57.8			0.5 - 4.2 ft: FILL.	
			12										0.5 - 0.9 ft: Gravel, coal and slag.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.9	13							56.2			0.9 - 1.6 ft: Brick fragments and sandstone cobbles, Grayish red (10YR4/2), with clay.	
			10							56.0			1.6 - 2.8 ft: Clayey Silt; Moderate reddish brown (10R4/6) and Grayish black (N2), silt -50%, clay -30%, with wood fragments.	
			7										2.8 - 4.2 ft: Coal and Slag; Grayish black (N2), coal -70%, slag -30%.	
SS	2.0	2.0	4							54.1			4.2 - 9.4 ft: Clayey SILT (ML); Dusky yellowish brown (10YR2/2) changing to Dark yellowish brown (10YR4/2) at 6.0', to Moderate reddish brown (10R4/6) at 7.3', to Dusky yellowish brown (10YR2/2) at 8.0' and to Moderate reddish brown (10R4/6) with mottling at 8.7'; very fine to fine grained, silt -50-70%, clay -20-50%, sand 0-10%; sandy silt with sandstone cobbles between 7.3 - 7.5'; low plasticity, moist.	Spoon refusal at 10.9'. Augered to 11.0'. Spoon refusal at 12.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
			2							54.0				
			4							53.8				
SS	2.0	1.5	5											
			13											
			11											
			9											
SS	2.0	2.0	7							50.5				
			9							50.0				
			13											
			50											
SS	0.9	0.9	17							48.6			9.4 - 10.2 ft: Silty CLAY (CL); Light olive gray (5Y6/1), clay -60%, silt -40%, some banding up to -1/8" thick, medium plasticity, moist.	Spoon refusal at 10.9'. Augered to 11.0'. Spoon refusal at 12.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
			50/5"							47.8				
SS	1.0	1.0	40							47.2			10.2 - 10.8 ft: SAND (SP); Grayish black, (N2) changing to Dusky yellowish brown (10YR2/2) at 10.5', medium grained, well sorted, wet.	
			50/6"							47.1				
										47.0			10.8 - 12.0 ft: SANDSTONE; Dark reddish brown (10R3/4), medium grained, blocky, iron-oxide cement.	
										46.0				

TOTAL DEPTH = 12.0 FT.

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R197**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R198			
Stepan Property				N 9470.0; E 11095.0		ANGLE FROM HORIZ		BEARING			
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-29-90		10-29-90	Hydro Group, Inc.	Mobile B-80	8"	5.3	6.7	12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
8.1/68*		0	6	NA	57.0	NA		5.3/51.7			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in			none		Robert Cook						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
							57.0			(Template: MYWD)	
SS	1.5	1.5	9 12 6				56.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R198.
SS	2.0	0.9	6 6 5 3				54.8			0.5 - 2.2 ft: FILL; Sandy Silt, Moderate brown (5YR3/4), fine to medium grained, silt -70%, sand -30%, with coal and slag below 1.5'.	Augered through asphalt to 0.5'.
							54.1			2.2 - 5.3 ft: Sandy to Clayey SILT, (ML); Dark yellowish brown (10YR4/2), very fine to fine grained, silt -60%, sand 0-20%, clay -20% increasing to -40% at 4.6', medium plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	2 3 10 21				53.0				
							51.7	5			
SS	2.0	1.2	10 21 27 30				51.4 51.0			5.3 - 11.3 ft: Silty SAND, (SM); Moderate brown (5YR4/4) changing to Dark reddish brown (10R3/4) at 6.0', mottled below 10.0'; fine to medium grained, silt -20-40%, sandstone cobbles below 8.0', no plasticity, moist.	
SS	2.0	1.6	28 20 17 23				49.8 49.0				
							47.4 47.0	10			
SS	1.5	1.3	12 26 50/6"				45.7 45.0				
TOTAL DEPTH = 12.0 FT.										Spoon refusal at 11.5'.	
										Augered to total depth of 12.0'.	
										3" PVC casing inserted to 11.5' for gamma-logging.	
										PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
										* Core recovery refers to total rock & soil sample.	
										Ground elevation estimated from site topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R198		



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
SITE				COORDINATES		14501	1 OF 1	R199		
Stepan Property				N 9470.0; E 11000.0		ANGLE FROM HORIZ		BEARING		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-29-90	10-29-90	Hydro Group, Inc.	Mobile B-80		8"	11.2	2.8	14.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
8.8/63*		0	7	NA	58.0	NA / NA		11.2/46.8		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLDS. CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.5	1.0	13 10 8			58.0 57.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R199. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 13.5'. Augered to total depth of 14.0'. 3" PVC casing inserted to 14.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	0.9	4 4 3 3			56.5 56.0			0.5 - 7.0 ft: FILL. 0.5 - 1.4 ft: Sandy silt; Dusky yellowish brown (10YR2/2), fine grained, silt -60%, sand -40%, some gravel. 1.4 - 7.0 ft: Silt; Grayish black (N2), very fine grained, clay <10%, with coal, fibrous material present, low plasticity, moist to wet below 6.0'.	
SS	2.0	0.8	4 2 1 1			54.0 53.2	5			
SS	2.0	1.2	1/12" 1 2			52.0			7.0 - 7.2 ft: Silty CLAY, (CL); Grayish red (10R4/2), mottled; very fine grained, medium plasticity, moist.	
SS	2.0	1.5	1/12" 4 8			51.0 50.8 50.0			8.0 - 8.8 ft: CLAY, (CL); Grayish brown (5YR3/2), medium plasticity, wet.	
SS	2.0	1.9	1 16 30 50			49.2 49.0 48.5 48.0	10		8.8 - 9.0 ft: SAND, (SP); Dusky yellowish brown (10YR2/2), medium grained, well sorted.	
SS	1.5	1.5	40 38 50/6"			47.5 46.8 46.1 46.0			9.0 - 10.5 ft: CLAY, (CL); Dark yellowish brown (10YR4/2), mottled, changing to Pale reddish brown (10R5/4) at 10.0' and to Light olive gray (5Y6/1) at 10.2', low to medium plasticity, moist.	
						44.5 44.0			10.5 - 11.2 ft: SAND, (SW); Dusky yellowish brown (10YR2/2), very fine grained at top to coarse grained at 11.2', well graded, moist.	
									11.2 - 13.5 ft: Silty SAND, (SM); Grayish red (10R4/2), mottled; fine grained, some pebbles up to 1 cm, medium plasticity, moist.	
TOTAL DEPTH = 14.0 FT.										
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property		Last Update: 03-19-92	HOLE NO. R199	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		ANGLE FROM HORIZ		BEARING			
Stepan Property				N 9460.0; E 10990.0		Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-30-90	10-30-90	Hydro Group, Inc.		Mobile B-80		8"	2.2	0.0	2.2		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
1.4/64*		0	2	NA	58.0	NA / NA		NA / NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Robert Cook					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
							58.0				
SS	1.5	1.2	18 23 29				57.8 57.5			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R200.
							56.3 56.0 55.8			0.5 - 2.2 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2), fine grained, gravel -15%, no plasticity, very stiff, dry.	
SS	0.2	0.2	80/3*							TOTAL DEPTH = 2.2 FT.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 14.0'. Spoon refusal at 2.2'. 3" PVC casing inserted to 2.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R200



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.		
SITE				COORDINATES			14501	1 OF 1	R201		
Stepan Property				N 9460.0; E 10985.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-30-90	10-30-90	Hydro Group, Inc.		Mobile B-80		8"	8.3	3.7	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
8.4/70*		0	6	NA	58.0	/ NA		8.3/49.7			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook						
(Template: HYWD)											
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							58.0				
SS	1.5	1.0	15 21 30				57.8 57.6			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R201.
SS	2.0	1.6	12 15 16 29				56.5 56.0			0.5 - 7.1 ft: Clayey SILT, (ML); Grayish brown (5YR3/2) changing to Dusky yellow brown (10YR2/2) at 1.2' and to Grayish brown (5YR3/2) at 1.3'; very fine grained, no plasticity, dry; gravel increasing to -20%, coal <5% and color change to Dusky brown (5YR2/2) at 2.0'; color change to Dusky yellowish brown (10YR2/2) at 4.0' with sandstone cobbles present.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.8	10 9 6 7				54.4 54.0				
SS	2.0	1.8	6 8 10 11				53.2 52.0	5		6.0 - 7.1 ft: Gravelly Clay, (CL); Dusky yellowish brown (10YR2/2), very fine to cobble size, low plasticity, wet.	
SS	1.7	1.6	13 16 30 50/2"				50.9 50.8 50.2 50.0 49.7			7.1 - 7.4 ft: Clayey SILT, (ML); Grayish black (N2), silt -70%, clay -30%, blocky, wet. 7.4 - 8.3 ft: Silty CLAY, (CL); Moderate brown (5YR3/4) changing to Light olive gray (5Y6/1) at 8.0', very fine grained, medium plasticity, moist.	
SS	2.0	1.6	29 26 23 20				48.4 48.0	10		8.3 - 11.6 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), fine grained, low plasticity, wet; sand content increasing at 10.0', mottled, fine to medium grained, silt -50%, sand -30%, clay -20%, sandstone cobbles present.	Spoon refusal at 9.7'. Augered to 10.0'
							46.4 46.0			TOTAL DEPTH = 12.0 FT.	Augered to total depth of 12.0'. 3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
										* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE			Stepan Property		Last Update: 03-19-92	HOLE NO. R201	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R202				
Stepan Property				N 9240.0; E 10817.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-30-90	10-30-90	Hydro Group, Inc.	Mobile B-80	8"	10.0	0.2	10.2					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
7.2/71*		0	6	NA	58.0	NA	10.0/48.0					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS CORE REC.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	1.5	0.9	7 10 28				58.0 57.8 56.6 56.0			0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 3.2 ft: Silty CLAY, (CL); Dusky brown (5YR2/2) changing to Grayish black (N2) at 2.7', very fine grained with gravel <10%; silt content increasing below 2.7' with solvent smell, very fine grained; no plasticity, moist.	Complete borehole number is B3890R202. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.8	28 29 31 30				54.8 54.2 54.0			3.2 - 7.2 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2), silt -60%, sand -40%, very fine grained, well sorted, no plasticity; increasing sand at 4.0'. Light brown (5YR5/6), very fine to medium grained at lower depth, bedding evident from 1/8" to 1/4" thick, subrounded to subangular grains, moist; changing to Moderate brown (5YR3/4) at 6.8', fine to medium grained.	High ppm in breathing area from borehole at -2'.	
SS	2.0	1.6	5 7 17 50				52.4 52.0	5		7.2 - 8.9 ft: SILT, (ML); Black (N1) changing to Grayish black (N2) at 8.0', organic (coal?) silt, very fine grained, no plasticity, moist.	Spoon refusal at 8.9'.	
SS	0.9	0.9	28 50/5"				50.8 50.2 50.0			10.0 - 10.2 ft: SANDSTONE; Dark reddish brown (10R3/4), blocky, iron-oxide cement, micaceous, very fine grained.	Augered to 10.0' Spoon refusal at 10.2'. 3" PVC casing inserted to 9.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.	
SS	0.2	0.2	50/3"				49.1 48.0 47.8	10		TOTAL DEPTH = 10.2 FT.	* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; 0 = OTHER				SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R202		



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R204
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9237.0; E 10755.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-31-90	10-31-90	Hydro Group, Inc.	Mobile B-80	8"	6.0	0.0	6.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.6/77*		0	3	NA	58.0	NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
							58.0				(Template: NYWD)	
SS	1.5	1.0	22 36 47				57.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R204. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	29 34 30				56.5 56.0				0.5 - 4.2 ft: Gravelly SILT, (ML); Grayish brown (5YR3/2) changing to Dark yellowish brown (10YR4/2) at 3.5', silt -50%, gravel -30%, sand -20%, gravel up to 4 cm, content decreasing below 2.0',	
SS	2.0	1.9	2 3 8 12				54.3 54.0 53.8				4.2 - 5.9 ft: SILT, (ML); Grayish black (N2), very fine grained, appearance of coal dust, no plasticity.	High PPM of organic vapors in breathing zone - solvent odor.
							52.1 52.0				TOTAL DEPTH = 6.0 FT.	Augered to total depth of 6.0'. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R204
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R205
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Stepan Property			N 9238.0; E 10710.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-30-90	10-30-90	Hydro Group, Inc.	Mobile B-80		8"	4.0	0.0	4.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
2.1/53*		0	2	NA	58.0	/ NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.						
							58.0				(Template: MYWD)	
SS	1.5	0.9	11 41 35				57.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R205.
SS	1.2	1.2	17 46 50/3"				56.6				0.5 - 3.2 ft: Sandy SILT, (ML); Grayish red (5R4/2) changing to Dusky yellowish brown (10YR2/2) at 2.0', fine grained, silt -65%, sand -30%, gravel -5%, no plasticity, dry.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							56.0					
							54.8					
							54.0					
TOTAL DEPTH = 4.0 FT.											High PPM of organic vapors in breathing zone - solvent odor. Spoon refusal at 3.2'. Augered to total depth of 4.0'. 3" PVC casing inserted to 3.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R205
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R206				
Stepan Property				N 9509.0; E 11095.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-30-90	10-30-90	Hydro Group, Inc.	Mobile B-80		8"	6.4	1.8	8.2				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.0/73*		0	5	NA	58.0	/ NA		6.4/51.6				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											(Template: MYWD)	
							58.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	
SS	1.5	0.8	2				57.8				0.5 - 0.9 ft: FILL; slag and coal, Grayish black (N2).	Complete borehole number is B3890R206.
			3				57.1				0.9 - 5.4 ft: Sandy SILT, (ML); Grayish brown (5YR3/2) changing to Moderate brown (5YR4/4) at 3.1' and to Moderate reddish brown (10R4/6) at 4.0', very fine grained, silt -60-80%, sand -20-40%, no plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	4				56.0					
			4				54.4					
			7				54.0					
			10				52.6	5				
SS	1.5	1.4	25				52.0					
			35				51.6				6.0 - 6.4 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), Light brown (5YR5/6) and Moderate brown (5YR3/4) banded layers, moist.	Spoon refusal at 5.5'. Augered to 6.0'
			50/6"									
SS	2.0	2.0	30				49.8				6.4 - 8.2 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), very fine grained, silt -70%, sand -30%, sandstone cobbles present, no plasticity; changing to weathered sandstone at 8.0', blocky, iron-oxide cement, micaceous.	Augered to 8.0' Spoon refusal at 8.2'. 3" PVC casing inserted to 7.0' for gamma-logging.
			48									
			50									
SS	0.2	0.2	50/3"									
TOTAL DEPTH = 8.2 FT.												
												PVC casing was removed after logging; hole was backfilled with drilling spoils.
												* Core recovery refers to total rock & soil sample.
												Ground elevation estimated from site topographic map.
												Description & classification by visual examination of sample.
												Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R206		



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **C207**

SITE: **Stepan Property** COORDINATES: **N 9412.0; E 11095.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **11-1-90** COMPLETED: **11-1-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **10.4** ROCK (FT.): **6.1** TOTAL DEPTH: **16.5**

CORE RECOVERY (FT./%): **8.8/53*** CORE BOXES: **0** SAMPLES: **6** E.L. TOP CASING: **NA** GROUND EL.: **57.0** DEPTH/EL. GROUND WATER: **NA / NA** DEPTH/EL. TOP OF ROCK: **10.4/46.6**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.						
							57.0					
SS	1.5	1.3	9 11 15				56.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 7.3 ft: FILL.	Complete borehole number is B3890C207.
							55.2				0.5 - 1.8 ft: Silty Sand, Dark reddish brown (10R3/4) changing to Dusky yellowish brown (10YR2/2) at 0.9', sand -50%, silt -40%, gravel -10%, fine to coarse grains, no plasticity.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							51.0	5			6.0 - 6.8 ft: Sandy Silt; Dusky brown (5YR2/2), fine to medium grained, silt -60%, sand -40%, no plasticity.	Hole was not continuously sampled; Hole R188 (2' south) was continuously sampled to 16.0'.
SS	2.0	2.0	3 3 5 5				49.7				6.8 - 7.3 ft: Sludge; conglomerated mixture of Medium dark gray (N4) to White (N9), swirled mass; clayey, low plasticity.	Augered from 2.0' to 6.0' without sampling.
							49.0				7.3 - 10.4 ft: SILT, (ML); Black (N1), very fine to fine grained, no plasticity, (Fill?).	Augered from 8.0' to 10.0' without sampling.
							47.0	10				Spoon refusal at 10.0'.
SS	1.0	1.2	13 50/-6"				46.6				10.4 - 16.5 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 11.5', silt -70%, sand -30%, fine to medium grained; some sandstone cobbles, blocky.	- Recovery in spoon was > recorded interval driven; i.e. sample to 10.2'.
SS	2.0	1.7	19 18 17 11				45.8					Augered to 10.5'.
							45.5					Spoon refusal at 16.5'.
SS	2.0	1.6	15 20 28 32				43.8					Augers were removed; hole was backfilled with grout and drilling spoils.
							43.5					
SS	1.0	1.0	29 50/6"				41.9	15				
							41.5					
							40.5					
TOTAL DEPTH = 16.5 FT.												

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **C207**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

C208

SITE

Stepan Property

COORDINATES

N 9452.0; E 11051.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-1-90

COMPLETED

11-1-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

7.4

ROCK (FT.)

0.6

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

6.5/81*

CORE BOXES

SAMPLES

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

7.4/49.6

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	WATER TEMPERATURES	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
									57.0				(Template: MYWD)	
SS	1.5	1.2	16						56.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890C208. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
			12						56.5				0.5 - 5.4 ft: FILL; Silt, Very dusky red (10R2/2) changing to Black (N1) at 2.5' and to Grayish black (N2) at 4.0'; silt -60%, sand -30%, gravel -10%; sandy, fine to coarse grained, between 0.5 - 2.5'; very fine grained, appearance of coal dust with blocky fragments at bottom, between 2.5 - 3.9'; gravelly with coal and slag content up to 50%, very fine to coarse grains below 4.0'; no plasticity, moist.	
SS	2.0	1.9	8						55.3					
			5						55.0					
SS	2.0	1.6	5						53.1					
			3						53.0					
			2						51.6					
SS	2.0	1.8	2						51.4					
			3						51.0					
			15						49.6					
			11						49.2					
									49.0					
													5.4 - 7.4 ft: Silty CLAY, (CL); Dusky yellowish brown (10YR2/2) changing to Moderate yellowish brown (10YR5/4) at 6.4', very fine grained, silt content decreases below 6.4', medium plasticity, moist.	Augered to total depth of 8.0'. 3" PVC casing inserted to 8.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
													7.4 - 7.8 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), very fine to coarse grained, no plasticity, moist.	
													TOTAL DEPTH = 8.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

C208



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R210			
Stepan Property				N 9670.0; E 10880.0		Vertical					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-2-90	11-2-90	Hydro Group, Inc.		Mobile B-80	8"	1.1	8.9	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
8.6/86*		0	5	NA	60.0	/ NA		1.1/58.9			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
							60.0			(Template: MYWD)	
SS	1.5	1.0	16 12 8				58.8 58.9 58.5 58.0			0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 1.1 ft: Gravelly CLAY, (CL); Dusky yellowish brown (10YR2/2), fine grains to cobbles, moist. 1.1 - 10.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grains, cobbles present at below 2.0' silt -70%, sand -30%, low plasticity, moist.	Complete borehole number is B3890R210. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.9	4 6 19 35				56.1 56.0	5			
SS	2.0	1.8	16 18 12 13				54.2 54.0				
SS	2.0	1.9	8 14 13 19				52.1 52.0				
SS	2.0	2.0	9 15 17 22				50.0	10			
TOTAL DEPTH = 10.0 FT.										Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
* Core recovery refers to total rock & soil sample.											
Ground elevation estimated from site topographic map.											
Description & classification by visual examination of sample.											
Colors from "Rock-Color Chart" (GSA, 1948).											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R210	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R211				
Stepan Property				N 9665.0; E 10800.0		Vertical						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-2-90	11-2-90	Hydro Group, Inc.	Mobile B-80	8"	0.5	7.5	8.0					
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK						
6.1/76*	0	4	NA	60.0	NA / NA	0.5/59.5						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	% CORE RECOVERY	LOSS	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											(Template: MYWD)	
											0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R211.
SS	1.5	0.9	25	26	28		58.8				0.5 - 7.6 ft: Gravelly SILT, (ML-SM); Moderate reddish brown (10R4/6); fine grains to cobble size, changing to Silty Sand at 2.0' and to Sandy Silt at 4.0; no plasticity, moist	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	6	13	16		58.0					
SS	2.0	1.9	25	26	20		56.3					
SS	2.0	1.6	25	27	28		54.1					
							52.4					
							52.0					
TOTAL DEPTH = 8.0 FT.											Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER											* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SITE							Stepan Property		Last Update: 03-19-92		HOLE NO. R211	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 1	R213			
SITE			COORDINATES			ANGLE FROM HORIZ BEARING					
Stepan Property			N 9665.0; E 10750.0			Vertical					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-5-90	11-5-90	Hydro Group, Inc.		Mobile B-80		8"	0.5	5.5	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
3.4/57*		0	3	NA	61.0	NA		0.5/60.8			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knuttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
						61.0			(Template: MYWD)		
SS	0.9	0.6	36 50/4*			80.8			0.0 - 0.5 ft: ASPHALT, over sand and gravel.	Complete borehole number is B3890R213.	
						59.9			0.5 - 5.5 ft: Gravelly SAND, (SW); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted, with minor silt, gravel is sandstone; changing to weathered sandstone at 5.0'; firm, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.3	10 8 7 6			59.0					
						57.7				Spoon refusal at 1.4'. Augered to 2.0'. Spoon refusal at 5.9'. Augered to total depth of 6.0'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
SS	1.9	1.5	6 19 37 50/5*			57.0	5				
						55.5			TOTAL DEPTH = 6.0 FT.		
						55.0					

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update: 03-19-92 HOLE NO. R213



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R214
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9663.0; E 10684.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-5-90	11-5-90	Hydro Group, Inc.	Mobile B-80		8"	0.9	3.1	4.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
2.9/73*		0	2	NA	62.0	NA		0.9/62.1		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
							62.0			(Template: MYWD)	
SS	1.5	1.4	13 23 27				61.8 61.1			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R214.
SS	2.0	1.5	17 19 22 23				60.1 60.0			0.2 - 0.9 ft: Gravelly SAND, (SW); Dark yellowish brown (10YR4/2), sand -40%, gravel -30%, silt -30%.	Augered through asphalt to 0.5'.
							58.5 58.0			0.9 - 3.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), sand -50%, silt -50%, no plasticity; with sandstone cobble, iron-oxide cement, blocky, fine grained, micaceous, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
TOTAL DEPTH = 4.0 FT.										Augered to total depth of 4.0'.	3" PVC casing inserted to 4.0' for gamma-logging.
										PVC casing was removed after logging; hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R214
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R215

SITE

Stepan Property

COORDINATES

N 9774.0; E 10655.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-5-90

COMPLETED

11-5-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.0

ROCK (FT.)

4.0

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

6.7/84*

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

68.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

4.0/64.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOBS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.4	3 4 5 7					68.0				0.0 - 1.4 ft: Silty SAND, (SM); Dusky yellowish brown (10YR2/2), sand -60%, silt -40%, color change to Light brown (5YR5/6) at 0.6' with increasing sand content; no plasticity, moist.	Complete borehole number is B3890R215. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	4 1 19 23				66.6 66.0				2.0 - 3.2 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained.		
SS	2.0	1.7	40 37 35 31				64.8 64.4 64.0				3.2 - 3.6 ft: Silty SAND, (SM); Light brown (5YR5/6), sand -80%, silt -20%, well sorted, no plasticity, moist.		
SS	2.0	2.0	15 28 24 37				62.3 62.0				4.0 - 8.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, no plasticity; changing to weathered sandstone at 5.0'.		
								60.0				TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.

(Template: MYLD)

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update: 03-19-92 HOLE NO. R215



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R216					
Stepan Property				N 9781.0; E 10673.0		ANGLE FROM HORIZ		BEARING					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-5-90	11-5-90	Hydro Group, Inc.		Mobile B-80	8"	4.6	1.6	6.2					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
5.4/87*		0	4	NA	68.0	/ NA		4.6/63.4					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook								
SAMP TYPE AND DIA.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.8	2	4				68.0				(Template: MYWD)	
			4					66.4				0.0 - 2.4 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2), changing to Moderate brown (5YR4/4) at 0.9', sand -60%, silt -40%, some rootlets, no plasticity, moist.	Complete borehole number is B3890R216.
SS	2.0	1.8	15					66.0				2.4 - 3.8 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), sandstone cobbles present, no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			17					65.6					
			20					64.2					
SS	1.8	1.8	22					64.0				4.0 - 4.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4), sand -60%, silt -40%, no plasticity, moist.	
			32					63.4					
			40					62.2				4.6 - 6.2 ft: SANDSTONE; Dark reddish brown (10R3/4), Moderate reddish brown (10R4/6) between 5.3 - 5.8'; very fine to fine grained, well sorted, subrounded to subangular grains, sand -80%, silt -20%, blocky structure, iron-oxide cement, moist.	Spoon refusal at 5.8'. Augered to 6.0'. Spoon refusal at 6.2' 3" PVC casing inserted to 6.0' for gamma-logging.
			50/3"					62.0					
SS	0.2	0.2	80/2"					61.8					PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 6.2 FT.													
* Core recovery refers to total rock & soil sample.													
Ground elevation estimated from site topographic map.													
Description & classification by visual examination of sample.													
Colors from "Rock-Color Chart" (GSA, 1948).													
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				Stepan Property		Last Update: 03-19-92		HOLE NO. R216	



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: C217

SITE: Stepan Property
 COORDINATES: N 9691.0; E 10656.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 11-5-90
 COMPLETED: 11-5-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Mobile B-80
 SIZE: 8"
 OVERBURDEN: 5.0
 ROCK (FT.): 3.0
 TOTAL DEPTH: 8.0

CORE RECOVERY (FT./%): 6.7/84*
 CORE BOXES: 0
 SAMPLES: 4
 EL. TOP CASING: NA
 GROUND EL.: 67.0
 DEPTH/EL. GROUND WATER: NA / NA
 DEPTH/EL. TOP OF ROCK: 5.0/62.0

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.							
SS	2.0	1.7	2 6 7 8						67.0				0.0 - 1.7 ft: Sandy SILT, (ML); Moderate brown (5YR3/4) changing to Light brown (5YR5/6) at 0.7', silt -60-70%, sand -30%, gravel up to 10% between 0.0 - 0.7', low plasticity, moist.	Complete borehole number is B3890C217. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	8 15 23 30					65.3 65.0				2.0 - 4.6 ft: SAND, (SP); Moderate brown (5YR4/4), fine to medium, subrounded grains; well sorted, no plasticity, slightly moist.		
SS	2.0	1.8	7 23 25					63.3 63.0				4.6 - 5.0 ft: Gravelly SILT, (ML); Moderate brown (5YR4/4), silt -40%, sand -40%, gravel -20%, moist.		
SS	2.0	1.5	20 15 16 50/5"					62.4 62.0 61.2 61.0	5			5.0 - 7.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), sandstone cobbles present, low plasticity, moist.		
								59.5 59.0				TOTAL DEPTH = 8.0 FT.	Spoon refusal at 7.9'. Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER
 SITE: Stepan Property
 Last Update: 03-19-92
 HOLE NO.: C217



GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **C218**

SITE **Stepan Property** COORDINATES **N 9686.0; E 10698.0** ANGLE FROM HORIZ. BEARING **Vertical**

BEGUN **11-5-90** COMPLETED **11-5-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Mobile B-80** SIZE **8"** OVERBURDEN **13.0** ROCK (FT.) **0.0** TOTAL DEPTH **13.0**

CORE RECOVERY (FT./%) **6.4/49*** CORE BOXES **0** SAMPLES **4** EL. TOP CASING **NA** GROUND EL. **67.0** DEPTH/EL. GROUND WATER **NA/NA** DEPTH/EL. TOP OF ROCK **NA/NA**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOCKS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.8	2 3 3					67.0				0.0 - 7.7 ft: FILL.	Complete borehole number is B3890C218. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole augered from 8.0' to 13.0' without sampling. 3" PVC casing inserted to 13.0' for gamma-logging.
SS	2.0	1.7	5 7 9 2				65.2 65.0				0.0 - 4.5 ft: Sandy to Clayey Silt, Moderate brown (5YR3/4), silt - 70%, sand - 30%; color change to Dusky brown (5YR2/2) with clay content increasing to -30% and medium plasticity between 0.9 - 1.8'; and changing to Dark reddish brown (10R3/4), silt - 60%, sand - 40%, low plasticity below 2.0'; moist.		
SS	2.0	1.2	3 3 2 1				63.3 63.0				4.5 - 7.7 ft: Sludge, swirled mixture of black, gray and white (N1 - N9), clayey.		
SS	2.0	1.7	2 1 1/12"				61.8 61.0 59.3	5					
								10					
								54.0				TOTAL DEPTH = 13.0 FT.	PVC casing was removed after logging and hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **C218**



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R219

SITE

Stepan Property

COORDINATES

N 9791.0; E 10756.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-6-90

COMPLETED

11-6-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

3.6

ROCK (FT.)

2.4

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

5.1/85%

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

66.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

3.6/62.4

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.9	2 5 10			66.0				(Template: MYWD)	
SS	2.0	1.9	4 11 16 23			65.1 64.1 64.0				0.0 - 0.9 ft: Sandy SILT, (ML); Dusky yellowish brown (10YR2/2), fine grained, silt -70%, sand -30%, moist. 0.9 - 3.6 ft: Silty SAND, (SM); Light brown (5YR5/6), fine to medium grained, sand -70%, silt -30%, no plasticity.	Complete borehole number is B3890R219. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	0.8	0.8	29 50/3"			62.4 62.1 62.0 61.2				3.6 - 5.5 ft: SANDSTONE; Dark reddish brown (10R3/4), micaceous, iron-oxide cement, blocky, very fine grained.	Spoon refusal at 4.8'. Augered to 5.0' Spoon refusal at 5.5'. Augered to total depth of 6.0'. 3" PVC casing inserted to 5.5' for gamma-logging.
SS	0.5	0.5	50/6"			61.0 60.5 60.0	5			TOTAL DEPTH = 6.0 FT.	PVC casing was removed after logging; hole was backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R219



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R220

SITE

Stepan Property

COORDINATES

N 9793.0; E 10823.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-6-90

COMPLETED

11-6-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.7

ROCK (FT.)

3.3

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

6.1/76*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

4.7/60.3

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.3	2 4 5 6				65.0					0.0 - 2.3 ft: Sandy SILT, (ML); Dusky yellow brown (5YR2/2), silt -70%, sand -30%, moist.	Complete borehole number is B3890R220. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 5.5' Augered to 6.0'. Spoon refusal at 7.8'. Augered to total depth of 8.0' 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
SS	2.0	1.7	2 1 2 3			63.7 63.0 62.7					2.3 - 4.7 ft: Silty SAND, (SM); Light brown (5YR5/6), sand -60%, silt -30%, clay -10%, low plasticity, moist.		
SS	1.5	1.5	6 9 50/6"			61.3 61.0 60.3		5			4.7 - 7.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), silt -60%, sand -30%, clay -10%, low plasticity, moist; Sandstone at 7.4', fine grained, subangular to subrounded grains, iron-oxide cement, moderately sorted, micaceous, blocky structure.		
SS	1.8	1.6	20 18 30 50/4"			59.5 59.0							
							57.4 57.0					TOTAL DEPTH = 8.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

R220



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R221

SITE

Stepan Property

COORDINATES

N 9796.0; E 10874.0

ANGLE FROM HORIZ
Vertical

BEGUN

11-6-90

COMPLETED
11-6-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

7.0

ROCK (FT.)

3.0

TOTAL DEPTH

10.0

CORE RECOVERY (FT./%)

7.3/73*

CORE BOXES

0

SAMPLES

5

SEL. TOP CASING

NA

GROUND EL.

65.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

7.0/58.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.1	2	3				65.0					
			5	6				64.3				0.0 - 0.7 ft: Sandy SILT, (ML); Dusky yellowish brown (10YR2/2), rootlets, grass, silt -60%, sand -30%, clay -10%.	Complete borehole number is B3890R221.
			4	4				63.9				0.7 - 1.1 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2).	
SS	2.0	1.4	2	3				63.0				2.0 - 3.4 ft: Clayey SILT, (ML); Light brown (5YR5/6), silt -70%, clay -30%, low plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			4	6				61.6				4.0 - 5.0 ft: Silty SAND, (SM); Light brown (5YR5/6), very fine to fine grained, well sorted, no plasticity, moist.	
SS	2.0	1.7	10	10				61.0				5.0 - 6.3 ft: Clayey SILT, (ML); Moderate brown (5YR4/4), low plasticity, moist.	Spoon refusal at 9.5'. Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
			9	11				60.0	5			6.3 - 7.0 ft: SAND, (SW); Moderate brown (5YR4/4), fine to coarse grains, no plasticity, moist.	
SS	2.0	1.8	10	14				59.3				7.0 - 9.3 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, moderately well sorted, micaceous, iron-oxide cement.	* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			11	15				58.7					
SS	1.5	1.3	13	30				57.2					
			50/6"					57.0					
								55.7					
								55.0	10			TOTAL DEPTH = 10.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R221



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP**
 JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R223**

SITE: **Stepan Property** COORDINATES: **N 9567.0; E 10485.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **11-6-90** COMPLETED: **11-6-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **3.5** ROCK (FT.): **2.0** TOTAL DEPTH: **5.5**

CORE RECOVERY (FT./%): **4.7/85*** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **61.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **3.5/57.5**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	13 14 17 19				61.0				0.0 - 3.5 ft: FILL; Gravelly silt, Grayish brown (5YR3/2), gravel, silt, sand mixture, concrete fragment at 2.5', dry. 3.5 - 5.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, micaceous, iron-oxide cement, blocky, no plasticity.	Complete borehole number is B3890R223. Borehole sampled and gamma-logged by TMA/Eberline Corp. Concrete at 2.5'. Spoon deviated to side of hole, spoon withdrawn and hole Augered to 3.0'.
SS	1.0	1.0	13 19			59.6						
SS	1.8	1.8	15 29 30 50/4"			59.0						
SS	0.5	0.5	50/6"			57.5						
							56.2 56.0 55.5	5			TOTAL DEPTH = 5.5 FT.	Spoon refusal at 4.8'. augered to 5.0' Spoon refusal at 5.5'. Augered to total depth of 5.5'. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R223**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
SITE				COORDINATES		14501	1 OF 1	R226		
Stepan Property				N 9260.0; E 10446.0		ANGLE FROM HORIZ		BEARING		
BEGUN				COMPLETED		DRILLER		DRILL MAKE AND MODEL		
11-6-90				11-6-90		Hydro Group, Inc.		Mobile B-80		
SIZE				OVERBURDEN		ROCK (FT.)		TOTAL DEPTH		
8"				12.5		1.5		14.0		
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		
10.5/75*		0		9		NA		56.0		
DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK								
NA		12.5/43.5								
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in			none			Robert Cook				
(Template: MYWD)										
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BL. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.				
SS	2.0	1.4	15 22 19 17				56.0		0.0 - 4.9 ft: FILL; Gravel, brick fragments, sand, silt and clay.	<p>Complete borehole number is B3890R226.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Spoon refusal at 7.9'. Augered to 8.0'</p> <p>Spoon refusal at 8.8'. Augered to 9.0'. Spoon refusal at 10.3'.</p> <p>Augered to 11.0'. Spoon refusal at 12.0'.</p> <p>Augered to 12.0'. Spoon refusal at 12.9'.</p> <p>Augered to 13.0'. Spoon refusal at 14.0'.</p> <p>Augered to total depth of 14.0'.</p> <p>3" PVC casing inserted to 13.5' for gamma-logging.</p> <p>PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.</p> <p>* Core recovery refers to total rock & soil sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>
SS	2.0	1.2	7 6 7 9				54.6 54.0 52.8			
SS	2.0	1.5	7 9 12 7				52.0 51.1 50.5	5	4.9 - 6.4 ft: SAND, (SP); Dusky yellowish brown (10YR4/2), medium grains, well sorted, no plasticity, moist.	
SS	1.9	1.9	7 4 9 50/4"				50.0 49.6		6.4 - 7.9 ft: Clayey SILT, (ML); Dusky brown (5YR2/2), silt -70%, clay -30%, sewer odor present; changing at 7.1' to Light olive gray (5Y6/1), silt -90%, sand -10%, very fine grained, well sorted; low plasticity, moist.	
SS	0.8	0.8	41 50/3"				48.1 48.0		8.0 - 8.9 ft: Silty SAND, (SM); Moderate brown (5YR4/4) changing to Dark reddish brown (10R3/4) at 8.8', very fine grained, sand -80%, silt -20%.	
SS	1.3	1.3	18 31 50/4"				47.2 47.0 46.5	10	9.0 - 9.5 ft: Sandy SILT, (ML); Grayish brown (5YR3/2), sand -50%, silt -50%, low plasticity.	
SS	1.0	1.0	39 50/6"				45.7 45.0		9.5 - 12.5 ft: SAND, (SP); Olive black (5Y2/1); medium grains between 9.5 - 11.3 and fine to medium grained between 11.7 - 12.5'; well sorted, wet; layer of claystone, Grayish orange pink (5YR7/2) between 11.3 - 11.7', blocky.	
SS	0.9	0.9	48 50/6"				43.5 43.1		12.5 - 13.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), blocky, iron-oxide cement, micaceous.	
SS	1.0	0.5	36 50/6"				43.0 42.5 42.0			
TOTAL DEPTH = 14.0 FT.										

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R226



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.								
SITE				COORDINATES		14501	1 OF 1	R227								
Stepan Property				N 9264.0; E 10436.0		Vertical		-----								
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH								
11-7-90	11-7-90	Hydro Group, Inc.	Mobile B-80		8"	2.0	0.0	2.0								
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK								
1.3/65*		0	2	NA	56.0	NA / NA		NA / NA								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:												
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>												
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE LOSS % CORE RECOVERY	WATER PRESSURE TESTS	LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
														(Template: MYMD)		
SS	2.0	1.3	4 14 30 17					56.0				0.0 - 1.3 ft: FILL; Sandy Silt, Moderate reddish brown (10R4/6), no plasticity, moist; concrete fragments and gravel below 0.8'.	Complete borehole number is B3890R227.			
SS	0.0	0.0	50/0"					54.0				TOTAL DEPTH = 2.0 FT.	Spoon refusal at 2.0'. Borehole backfilled with drilling spoils.			
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER													SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R227



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			COORDINATES	14501	1 OF 1	R228
Stepan Property			N 9264.0; E 10438.0	ANGLE FROM HORIZ		BEARING
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
11-7-90	11-7-90	Hydro Group, Inc.	Mobile B-80	8"	10.0	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
7.5/75%		0	6	NA	56.0	↓ / NA
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:	
140 lbs/30 in			none		Robert Cook	

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	3 0 8			56.0			0.0 - 4.5 ft: FILL; Gravel, concrete, asphalt, sand, silt and clay.	Complete borehole number is B3890R228. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 9.0'. Augered to 9.0'. Spoon refusal at 9.9'. Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	0.8	3 9 12 11			54.6				
SS	2.0	1.6	8 8 14 25			54.0				
SS	2.0	1.8	4 4 6 10			53.2				
SS	2.0	1.8	4 4 6 10			52.0				
SS	2.0	1.8	4 4 6 10			51.5	5		4.5 - 7.4 ft: SAND, (SP); Light brown (5YR5/6), medium to coarse grains, well sorted, moist.	
SS	1.0	1.0	24 50/6"			50.4			7.4 - 7.8 ft: Sandy SILT, (ML); Olive gray (5YR4/1), fine grains, well sorted, no plasticity, moist.	
SS	0.9	0.9	17 50/4"			50.0			8.0 - 9.0 ft: Silty CLAY, (CL); Grayish brown (5YR3/2), mottled; layered with Light brown (5YR3/2) and Grayish black (N2) bands; medium plasticity, moist.	
						48.6			9.0 - 9.9 ft: SAND, (SP); Dusky yellowish brown (10YR2/2), medium grained, well sorted, no plasticity, wet.	
						48.2				
						48.0				
						47.0				
						46.1				
						46.0	10		TOTAL DEPTH = 10.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R228
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE Stepan Property				COORDINATES N 9334.0; E 10390.0		14501	1 OF 1	R229				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-7-90	11-7-90	Hydro Group, Inc.	Mobile B-80	8"	6.6	0.0	6.6					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
2.9/44*		0	4	NA	56.0	NA NA	NA/NA					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Robert Cook						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	0.7	0.4	24 50/2"				56.0 55.6				0.0 - 6.6 ft: FILL. 0.0 - 2.3 ft: Gravel, sand, silt and clay.	Complete borehole number is B3890R229.
SS	2.0	1.1	4 7 9 11				54.0 52.9				2.3 - 2.7 ft: Coal and slag. 2.7 - 3.1 ft: Sandy Silt; Dark yellowish brown (10YR4/2), no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.8	2 5 3 4				52.0 51.2				4.0 - 4.5 ft: Sand; Moderate brown (5YR4/4), moist. 4.5 - 4.8 ft: Clay; with silt and wood fragments.	Spoon refusal at 0.7'. Augered to 2.0'
SS	0.6	0.6	3-50/1"				50.0 49.4				6.0 - 6.6 ft: Silty Clay; Moderate brown (5YR3/4), with slag below 6.4'. TOTAL DEPTH = 6.6 FT.	Augered to 6.0' Spoon refusal at 6.6'. 3" PVC casing inserted to 5.5' for gamma-logging.
* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property			Last Update: 03-19-92		HOLE NO. R229	



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R230
SITE Stepan Property		COORDINATES N 9344.0; E 10390.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 11-7-90	COMPLETED 11-7-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 16.8	ROCK (FT.) 1.2
CORE RECOVERY (FT./%) 10.8/60°		CORE BOXES 0	SAMPLES 10	EL. TOP CASING NA	GROUND EL. 56.0	DEPTH/EL. GROUND WATER NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP REC. CORE REC.	SAMP BL CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.4	36 37 21				56.0		0.0 - 5.5 ft: FILL; Gravelly, Sandy Silt, Light brown (5YR5/6) changing to Grayish orange (10YR7/4) at 4.0', minor clay, Slag below 2.0', brick fragments <5%.	Complete borehole number is B3890R230.	
SS	2.0	1.8	5 6 5 5				54.6 54.0			Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.5	4 3 2				52.2 52.0			Spoon refusal at 11.5'.	
SS	2.0	0.5	1 1 2 3				50.5 50.0 49.5	5	6.0 - 8.3 ft: CLAY, (CL); Olive gray (5Y4/1), very fine grained, high plasticity, very sticky, wet.	Augered to 12.0'. Spoon refusal at 13.9'.	
SS	2.0	1.5	16 31 28 50				48.0 47.7		8.3 - 16.7 ft: SAND, (SP); Grayish black (N2) interlayered with Brownish gray (5YR4/1), Olive black (5Y2/1) and Brownish black (5YR2/1); medium sand between 8.3 - 8.6', fine to medium sand between 8.6 - 12.8', fine sand between 14.0 - 14.5' and medium to coarse sand below; well sorted, rounded to angular grains, moist to wet.	Augered to 14.0'. Spoon refusal at 15.5'.	
SS	1.5	1.0	8 12 50/6"				46.5 46.0 45.0	10		Augered to 16.0'. Spoon refusal at 16.8'.	
SS	1.9	0.8	5 18 32 50/5"				44.0 43.2			Augered to 17.0'. Spoon refusal at 17.9'.	
SS	1.5	0.9	31 41 50/6"				42.0 41.1	15		Augered to total depth of 18.0'. 3" PVC casing inserted to 18.0' for gamma-logging.	
SS	0.8	0.8	41 50/3"				40.0			PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
SS	0.9	0.6	29 50/4"				39.3 39.2 39.0 38.4 38.0		16.7 - 17.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to very fine grained, silt -60%, sand -20%, clay -20%, low plasticity, weathered sandstone below 17.0'.		
TOTAL DEPTH = 18.0 FT.										* Core recovery refers to total rock & soil sample.	
										Ground elevation estimated from site topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update:
03-19-92

HOLE NO.
R230



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501	1 OF 1	R231					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
Stepan Property			N 9781.0; E 10411.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-8-90	11-8-90	Hydro Group, Inc.		Mobile B-80		8"	1.5	4.5	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.9/82*		0	3	NA	63.0	/ NA		1.5/61.5					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
								63.0				(Template: MYWD)	
SS	1.5	1.3	18					62.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R231. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
			17					61.5				0.5 - 1.5 ft: SAND, (SP); Moderate brown (5YR4/4), fine grained, well sorted, no plasticity, moist.	
SS	2.0	1.6	20					61.2				1.5 - 6.0 ft: SANDSTONE; Dark reddish brown (10R3/4), weathered, blocky, iron-oxide cement, micaceous, moist.	
			26					61.0					
			22										
			26										
SS	2.0	2.0	23					59.4					
			26					59.0					
			33										
			28										
								57.0					
											TOTAL DEPTH = 6.0 FT.		Augered to total depth of 6.0'. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
													* Core recovery refers to total rock & soil sample.
													Ground elevation estimated from site topographic map.
													Description & classification by visual examination of sample.
													Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				Stepan Property		Last Update: 03-19-92		HOLE NO. R231	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
SITE				COORDINATES		14501	1 OF 1	R232	
Stepan Property				N 9700.0; E 10090.0		Vertical		-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-8-90	11-8-90	Hydro Group, Inc.	Mobile B-80	8"	8.9	3.1	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
8.0/67*		0	6	NA	58.0	/ NA		8.9/49.1	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in		none			Robert Cook				
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	
					LOSS G.P.M.	PRESS. P.S.F.			TIME IN MIN.
SS	2.0	1.6	10 27 38 40				58.0		
SS	2.0	1.4	18 13 7 4				56.4 56.0		
SS	2.0	1.1	1/12" 1/12"				54.6 54.0		
SS	2.0	1.4	1 2 4 9				52.9 52.0	5	
SS	2.0	1.6	8 7 9 13				50.6 50.0		
SS	2.0	0.9	6 12 18 34				49.1 48.4 48.0	10	
							47.1		
							46.0		
(Template: NYMD) DESCRIPTION AND CLASSIFICATION								NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
0.0 - 3.4 ft: FILL. 0.0 - 2.4 ft: Sand, silt, sandstone, slag and coal, Grayish black (N2), fine grains to gravel, no plasticity. 2.4 - 2.9 ft: Slag, Black (N2) to White (N9), with Light brown (5YR5/6). 2.9 - 3.4 ft: Sludge; Very light gray (N8), very fine grained, no plasticity, dry. 4.0 - 5.1 ft: SILT, (ML); Dark yellowish brown (10YR4/2), very fine grained, wet. 6.0 - 8.9 ft: Clayey SILT, (ML); Light brown (5YR5/6), fine grained, silt -60-80%, clay -20%, sand -0-20%, low plasticity, moist. 8.9 - 12.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, low plasticity, moist.								Complete borehole number is B3890R232. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
TOTAL DEPTH = 12.0 FT.								Augered to total depth of 12.0'. 3" PVC casing inserted to 11.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
								* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Last Update:		HOLE NO.	
Stepan Property				03-19-92		R232			



GEOLOGIC DRILL LOG				PROJECT			JOB NO.		SHEET NO.		HOLE NO.				
SITE				COORDINATES			14501		1 OF 1		R233				
Stepan Property				N 9700.0; E 10080.0			Vertical		ANGLE FROM HORIZ		BEARING				
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN		ROCK (FT.)		TOTAL DEPTH	
11-8-90		11-8-90		Hydro Group, Inc.		Mobile B-80		8"		12.5		3.5		16.0	
CORE RECOVERY (FT./%)			CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
8.5/53*			0		7		NA		58.0		/ NA		12.5/45.5		
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:							
140 lbs/30 in				none				Robert Cook <i>[Signature]</i>							
(Template: MYWD)															
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS % CORE RECOVERY	LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
SS	2.0	1.7	5 10 22 24				58.0				0.0 - 3.1 ft: FILL; Moderate brown (5YR3/4); with Grayish black (N2) coal and slag between 0.6 - 1.7'; color change to a mixture of Black (N1), White (N9) and Light brown between 1.5 - 3.1'.	Complete borehole number is B3890R233.			
SS	2.0	1.1	20 14 10 11				56.3 56.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.			
SS	2.0	0.3	1 2 2 1				54.0 53.7	5			4.0 - 4.3 ft: Sandy SILT, (ML); Dusky yellowish brown (10YR2/2), fine to medium grained, silt -60%, sand -40%, no plasticity, wet.				
SS	2.0	1.2	1 1 3 15				52.0 51.4 50.8				6.0 - 6.6 ft: CLAY, (CL); Dusky yellowish brown (10YR4/2), very fine grained, medium plasticity, soft, moist. 6.6 - 7.2 ft: Silty SAND, (SM); Moderate brown (5YR4/4), fine to medium grained, low plasticity, moist.				
SS	2.0	1.9	2 15 40 28				50.0				8.0 - 12.5 ft: SAND, (SW); Moderate yellowish brown (10YR5/4) to Dusky yellowish brown (10YR2/2); angular to subrounded, coarse to fine grains grading to medium to coarse grains between 10.0 - 11.2' with bedding; no plasticity, moist to wet at 10.0'.				
SS	2.0	1.2	4 14 31 22				48.1 48.0	10				Spoon refusal at 14.5'.			
SS	2.0	0.7	1 4 14 12				46.8 46.0 45.5 45.3				12.5 - 14.4 ft: Sandy SILT, (ML); Dark reddish brown (10YR3/4), very fine grained, silt -70%, sand -30%, no plasticity.	Augered to total depth of 16.0'. 3" PVC casing inserted to 16.0' for gamma-logging.			
SS	0.4	0.4	50/5"				44.0 43.6	15				PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.			
TOTAL DEPTH = 16.0 FT.															
* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).															

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R233



GEOLOGIC DRILL LOG			PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R234
SITE Stepan Property			COORDINATES N 9700.0; E 10110.0			ANGLE FROM HORIZON Vertical	
BEGUN 11-8-90	COMPLETED 11-8-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 8.7	ROCK (FT.) 1.3	TOTAL DEPTH 10.0
CORE RECOVERY (FT./%) 6.6/66*	CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 58.0	DEPTH/EL. GROUND WATER NA	DEPTH/EL. TOP OF ROCK 8.7/49.3	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	LOSS G.P.M.	WATER PRESS. TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
			18				58.0					
SS	1.4	1.1	35				57.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R234. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 1.9'. Augered to 2.0'. Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			50/5"				56.4				0.5 - 4.7 ft: FILL.	
							56.0				4.7 - 6.3 ft: CLAYEY SILT, (ML); Dark yellowish brown (10YR4/2), very fine grained, silt -80%, clay -20%, low plasticity, moist.	
SS	2.0	1.1	20				54.9				6.3 - 6.8 ft: CLAY, (CL); Dark yellowish brown (10YR4/2), very fine grained, medium plasticity, wet.	
			12				54.0				6.8 - 8.7 ft: SANDY SILT, (ML); Moderate yellowish brown (10YR5/4), mottled; fine to medium grained, silt -70%, sand -30%, moist.	
			5				53.3				8.7 - 9.7 ft: SANDY SILT, (ML); Dark reddish brown (10R3/4), very fine grained, with sandstone cobbles, low plasticity, moist.	
			3				52.9	5				
			3				52.0					
SS	2.0	1.6	1				51.7					
			3				51.2					
			15				50.4					
SS	2.0	1.7	4				50.0					
			12				49.3					
			14				48.3					
			18				48.0	10				
TOTAL DEPTH = 10.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R234
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GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R235**

SITE: **Stepan Property** COORDINATES: **N 9700.0; E 10120.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **11-9-90** COMPLETED: **11-9-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **9.2** ROCK (FT.): **0.8** TOTAL DEPTH: **10.0**

CORE RECOVERY (FT./%) **6.9/69*** CORE BOXES: **0** SAMPLES: **5** EL. TOP CASING: **NA** GROUND EL.: **58.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **9.2/48.8**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
							58.0					
SS	1.5	1.2	40 38 36				57.8 57.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 4.2 ft: FILL. 0.5 - 1.5 ft: Gravel, sand, silt and slag, Grayish black (N2). 1.5 - 2.5 ft: Sludge, Very light gray (N8), very fine grain, no plasticity, moist. 2.5 - 3.3 ft: Slag, Black (N1) to White (N9) with Light brown (5YR5/6), moist. 3.3 - 4.2 ft: Sludge, Very light gray (N8) to Pinkish gray (5YR3/2), very fine grained, no plasticity, moist. 4.2 - 6.7 ft: Clayey SILT, (ML); Grayish brown (5YR3/2) to Moderate yellowish brown (10YR5/4) below 6.0', silt -70%, clay -30%, low plasticity, moist. 6.7 - 9.2 ft: Sandy SILT, (ML); Moderate brown (5YR4/4), fine grained, silt -60%, sand -30%, clay -10%, some sandstone cobbles, no plasticity, moist; mottled with up to 2" layers below 8.0'. 9.2 - 9.8 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), very fine grained, no plasticity, moist; Sandstone below 9.7', blocky, iron-oxide cement.	Complete borehole number is B3890R235. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	14 15 12 8				56.3 56.0					
SS	2.0	0.7	1 2 1 2				54.4 54.0 53.8 53.3	5				
SS	2.0	1.8	2 5 17 18				52.0 51.3					
SS	2.0	1.8	9 15 18 23				50.4 50.0					
							48.8 48.2 48.0	10				Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
TOTAL DEPTH = 10.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **Stepan Property** Last Update: **03-19-92**

HOLE NO.: **R235**



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R236
SITE Stepan Property			COORDINATES N 9710.0; E 10120.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 11-9-90	COMPLETED 11-9-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 8.9	ROCK (FT.) 3.1	TOTAL DEPTH 12.0	
CORE RECOVERY (FT./%) 8.5/71*		CORE BOXES 0	SAMPLES 6	EL. TOP CASING NA	GROUND EL. 58.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK 8.9/49.1
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS	% CORE RECOVERY	LOSS	WATER PRESSURE		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						G.P.M.	P.S.I.						
								58.0					
SS	1.5	1.3	23					57.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R236. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 11.9'. Augered to total depth of 12.0'. 3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			33					56.2				0.5 - 4.3 ft: FILL.	
			42					56.0				0.5 - 1.5 ft: Gravel, sand, silt and slag, Grayish black (N2).	
SS	2.0	1.9	10					54.1				1.5 - 2.5 ft: Sludge; Very light gray (N8), very fine grained, silty, no plasticity, dry.	
			7					54.0				2.5 - 2.8 ft: Gravel and slag; Black (N1) to White (N9) with Light brown (5YR6/4).	
			5					53.7				2.8 - 4.3 ft: Sludge; Very pale orange (10YR8/2), very fine grained, silty to clayey, low plasticity.	
SS	2.0	0.8	3					53.2	5			4.3 - 7.0 ft: SILT, (ML); Grayish brown (5YR3/2) to Moderate yellowish brown (10YR5/4), silt -90%, sand - 10%, low plasticity, wet.	
			2					52.0					
			3					51.0					
			7					50.5					
			9					50.1					
SS	2.0	1.6	9					50.0				7.0 - 7.5 ft: SAND, (SW); Moderate brown (5YR4/4), sand -90%, silt -10%, moist.	
			13					49.1				7.5 - 8.9 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4) alternating with Moderate brown (5YR4/4), fine grained, some rounded quartz pebbles and sandstone cobbles.	
			17					48.4					
			20					48.0				8.9 - 11.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, low plasticity, very dense.	
SS	1.9	1.0	9					47.0	10				
			11					46.0					
			17										
			50/4"										
TOTAL DEPTH = 12.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R236
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R237
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9720.0; E 10120.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-12-90	11-12-90	Hydro Group, Inc.	Mobile B-80		8"	6.9	3.1	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.0/50*		0	5	NA	58.0	/ NA		6.9/51.1		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
							58.0			(Template: MYWD)	
							57.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R237. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							56.3			0.5 - 3.5 ft: FILL.	
SS	1.5	1.2	8 15 13				56.0			0.5 - 2.9 ft: Gravel and slag; Grayish black (N2), White (N9), and Light Brown (5YR5/6).	
SS	2.0	1.5	10 10 7 4				54.5			2.9 - 3.5 ft: Sludge; Very pale orange (10YR8/2), very fine grained, silty, no plasticity, moist; mixed with gravel and slag, Medium dark gray (N4) to White (N9) and Grayish black (N2), below 3.0'.	
SS	2.0	0.3	1 1/12" 3				54.0			4.0 - 6.9 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), medium grained, sand -70%, silt -30%, no plasticity, moist to wet.	
SS	2.0	1.4	1 1 2 9				53.7	5			
							52.0			6.9 - 8.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -60%, sand -40%, trace mottled light brown (5YR5/6) clayey silt, moist.	
SS	2.0	0.6	9 10 11 30				51.1				
							50.6				
							50.0				
							49.4				
							48.0	10		TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	LOG Update: 03-19-92	HOLE NO. R237
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GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R238
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
Stepan Property			N 9710.0; E 10150.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-12-90	11-12-90	Hydro Group, Inc.	Mobile B-80		8"	7.5	1.0	8.5			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.1/72*		0	5	NA	58.0	NA / NA		7.5/50.5			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOMS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								58.0				(Template: MYMD)	
SS	1.5	1.4	8					57.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R238. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 8.0'. Spoon refusal at 8.5'. 3" PVC casing inserted to 8.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			10					56.6				0.5 - 4.2 ft: FILL; Various colors, Grayish black (N2), White (N9), Dusky brown (5YR2/2), Pale reddish brown (10R5/4) and Very pale orange (10YR8/2); mixture of gravel, silt, clay, slag, and sludge, low plasticity.	
SS	2.0	1.0	11					56.0					
			10					55.0					
			3					54.0					
SS	2.0	1.6	4					53.8					
			2					53.1					
			2					52.4					
			3					52.0					
SS	2.0	1.6	1					50.5					
			5					50.4					
			12					50.0					
			30					49.5					
SS	0.5	0.5	50/6"										
TOTAL DEPTH = 8.5 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R238
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GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R239**

SITE **Stepan Property** COORDINATES **N 9685.0; E 10267.0** ANGLE FROM HORIZ BEARING **Vertical**

BEGUN **11-12-90** COMPLETED **11-12-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Mobile B-80** SIZE **8"** OVERBURDEN **4.7** ROCK (FT.) **0.0** TOTAL DEPTH **4.7**

CORE RECOVERY (FT./%) **3.5/74*** CORE BOXES **0** SAMPLES **3** EL. TOP CASING **NA** GROUND EL. **58.0** DEPTH/EL. GROUND WATER **NA/NA** DEPTH/EL. TOP OF ROCK **NA/NA**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
			9 11 13				58.0 57.5			0.0 - 0.5 ft: GRAVEL; (parking area). 0.5 - 4.5 ft: FILL; Moderate brown (5YR3/4) changing to Grayish black (N2) at 1.2' and to Olive gray (5Y4/1) at 2.9'; clay and silt -70%, gravel and slag -30%, no plasticity. wet.	Complete borehole number is B3890R239. Augered through gravel to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
SS	1.5	1.2					56.3 56.0				
SS	2.0	1.8	21 11 13 10				54.2 54.0 53.5 53.3				
SS	0.7	0.5	3-50/2"							TOTAL DEPTH = 4.7 FT.	Spoon refusal at 4.7'; hole terminated. 3" PVC casing inserted to 3.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

(Template: MYWD)

* Core recovery refers to total rock & soil sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **R239**



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R240

SITE

Stepan Property

COORDINATES

N 9725.0; E 9900.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN

COMPLETED

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

6.3

ROCK (FT.)

3.7

TOTAL DEPTH

10.0

CORE RECOVERY (FT./%)

6.6/66*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

6.3/51.7

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOMS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.6	18 17 20 21						58.0				<p>(Template: MYWD)</p> <p>0.0 - 4.7 ft: FILL, Dark yellowish brown (10YR4/2) changing to Moderate brown (5YR3/4) at 0.6' and to Grayish black (N2) at 2.0'; silt -50-70%, gravel -10-30%, sand -20%, with brick fragments, coal and slag below 4.0', dry.</p> <p>6.0 - 6.3 ft: Sandy SILT, (ML); Light olive gray (5Y5/2), very fine to fine grained, silt -80%, sand -20%, no plasticity, dry.</p> <p>6.3 - 9.7 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), mottled with Grayish black (N2) streaks; silt -80%, sand -10%, clay -10%, no plasticity.</p>	<p>Complete borehole number is B3890R240.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Spoon refusal at 2.9'.</p> <p>Augered to 4.0'.</p>
SS	0.9	0.8	24 50/5*					56.4 56.0						
SS	2.0	0.7	6 2 2 4					54.0 53.3	5					
SS	2.0	1.8	3 3 7 10					52.0 51.7						
SS	2.0	1.7	3 17 19 25					50.2 50.0						
								48.3 48.0	10					
TOTAL DEPTH = 10.0 FT.												Augered to total depth of 10.0'.		
												3" PVC casing inserted to 10.0' for gamma-logging.		
												PVC casing was removed after logging and hole was backfilled with drilling spoils.		
												* Core recovery refers to total rock & soil sample.		
												Ground elevation estimated from site topographic map.		
												Description & classification by visual examination of sample.		
												Colors from "Rock-Color Chart" (GSA, 1948).		

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R240



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R241

SITE

Stepan Property

COORDINATES

N 9700.0; E 9925.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-12-90

COMPLETED

11-12-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

6.6

ROCK (FT.)

2.6

TOTAL DEPTH

9.2

CORE RECOVERY (FT./%)

7.2/78*

CORE BOXES

0

SAMPLES

5

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

6.6/50.4

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLDS. % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.5	17 19 12 6				57.0				0.0 - 5.5 ft: FILL. 0.0 - 0.8 ft: Gravelly Silt; Dark yellowish brown (10YR4/2), silt -50%, gravel -30%, sand -20%, dry.	Complete borehole number is B3890R241. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	12 23 28 30				55.5 55.0				0.8 - 2.7 ft: Sandy Silt; Grayish brown (5YR3/2) changing to Olive gray (5Y4/1) at 2.2' and to Very Dusky red (10R2/2) at 2.7', fine to medium grains, silt -80-80%, sand -20%, gravel 0-20%, no plasticity.	
SS	2.0	1.5	20 9 7 8				53.5 53.0				2.7 - 5.5 ft: Gravelly Silt; Moderate brown (5YR3/4), with sand and brick fragments.	
SS	2.0	1.5	9 10 15 23				51.5 51.0 50.4				6.0 - 6.6 ft: Sandy SILT, (ML); Moderate olive brown (5Y4/4), fine to coarse grained, silt -80%, sand -10%, gravel -10%.	
SS	1.0	1.2	26 50/-8"				49.5 49.0				6.6 - 9.2 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -80%, sand -10%, clay -10%, no plasticity; changing to Sandstone at 8.0', very fine grained, micaceous, blocky.	
							47.8				TOTAL DEPTH = 9.2 FT.	Spoon refusal at 9.0'. - Recovery in last spoon was > recorded interval driven; i.e. sample to 9.2'. Augered to 9.0'. 3" PVC casing inserted to 9.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update: 03-19-92
HOLE NO. R241



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R242

SITE

Stepan Property

COORDINATES

N 9682.0; E 9900.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

11-13-90

COMPLETED

11-13-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

10.0

ROCK (FT.)

2.3

TOTAL DEPTH

12.3

CORE RECOVERY (FT./%)

8.7/71*

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

NA

NA

DEPTH/EL. TOP OF ROCK

10.0/47.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS RECOVERY	WATER PRESS. TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	9 11 6		57.0				0.0 - 3.8 ft: FILL; Moderate yellowish brown (10YR5/4) to Dusky brown (5YR3/4); silt -60%, gravel -20, sand -20%, some clay; changing to fine to gravel size coal and slag, Grayish black (N2), below 2.8'; moist.	Complete borehole number is B3890R242.
SS	2.0	1.8	7 9 8		55.6 55.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	2 1 1 15		53.2 53.0 52.4			4.0 - 4.6 ft: Silty CLAY, (CL); Dark yellowish brown (10YR4/2), very fine grained, clay -70%, silt -30%, high plasticity, moist.		
SS	2.0	1.3	12 20 22 28		51.2 51.0			4.6 - 8.9 ft: Sandy SILT, (ML); Brownish gray (5YR4/1), interlayered with Black (N1) bands and mottled between 6.0 - 7.3' changing to Brownish black (5YR2/1) at 8.0'; very fine to fine grained, silt -70% sand -20% decreasing to -10% below 8.0', clay -10%, no plasticity, moist to wet.		Spoon refusal at 8.9'.
SS	0.9	0.9	27 50/5"		49.7 49.0					
					48.1					
SS	1.3	1.2	27 12 50/3"		47.0				10.0 - 12.3 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), fine grained, no plasticity, moist; Sandstone at 10.5', mottled, micaceous, blocky, iron-oxide cement; fracture planes at 12.0'.	Augered to 10.0'
					45.8					Spoon refusal at 11.3'.
SS	0.3	0.3	50/3"		45.0 44.7					Spoon refusal at 12.0'
									TOTAL DEPTH = 12.3 FT.	Augered to 12.0'
										Spoon refusal at 12.3'.
										3" PVC casing inserted to 12.0' for gamma-logging.
										PVC casing was removed after logging and hole was backfilled with drilling spoils.
										* Core recovery refers to total rock & soil sample.
										Ground elevation estimated from site topographic map.
										Description & classification by visual examination of sample.
										Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R242



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R243

SITE

Stepan Property

COORDINATES

N 9223.0; E 9980.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-13-90

COMPLETED

11-13-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

10.0

ROCK (FT.)

0.7

TOTAL DEPTH

10.7

CORE RECOVERY (FT./%)

5.9/55%

CORE BOXES

0

SAMPLES

7

EL. TOP CASING

NA

GROUND EL.

54.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

10.0/44.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE CORE RECOVERY	LOSS IN G.P.H	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.F.	TIME MIN.						
SS	0.8	0.6	5				54.0				0.0 - 2.8 ft: FILL; Moderate brown (5YR3/4) to Brownish gray (5YR4/1), fine grains to gravel size up to -1 cm; silt, sand, gravel, and slag, moist.	Complete borehole number is B3890R243.
			50/2"				53.4					
SS	2.0	1.8	19				52.0				2.8 - 3.8 ft: Sandy SILT, (ML); Brownish black (5YR2/1) to Olive black (5Y2/1), fine grained, no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			11				51.2					
			12				50.2					
			15				50.0					
SS	2.0	1.9	3				48.3				4.0 - 5.7 ft: Silty CLAY, (CL); Moderate brown (5YR4/4) to Medium dark gray (N4) changing to Dark yellowish brown (10YR4/2), mottled at 4.4', fine grained, clay -70%, silt -20%, sand -10%, medium plasticity, moist.	Spoon refusal at 0.8'. Augered to 2.0'
			3				48.1					
			5				48.0					
			30				47.5					
SS	0.5	0.5	50/6"				47.0					
							46.6					
SS	0.4	0.4	50/5"				44.0				5.7 - 7.4 ft: Sandy SILT to SILT, (ML); Dark reddish brown (10R3/4), fine to coarse grains, silt -60%, sand -40%; changing to Silt, Medium gray (N5), very fine grains at 6.4'; no plasticity, very dense, moist.	Spoon refusal at 6.5'. Augered to 7.0'. Spoon refusal at 7.4'. Augered to 8.0'. Spoon refusal at 8.0'. Very dense silt or boulder between 8.0 - 10.0'.
							43.3					
SS	0.7	0.7	35								10.0 - 10.7 ft: SANDSTONE, Dark reddish brown (10R3/4), fine grained, thin bedded, micaceous, blocky, iron-oxide cement, moist.	Augered to 10.0'. Spoon refusal at 10.7'
			50/2"									
											TOTAL DEPTH = 10.7 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R243



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES			14501	1 OF 1	R244				
Stepan Property				N 9171.0; E 9922.0			ANGLE FROM HORIZ		BEARING				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-13-90	11-13-90	Hydro Group, Inc.		Mobile B-80		8"	7.1	2.9	10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
8.2/82*		0	5	NA	54.0	7 / NA 5 / NA		7.1/46.9					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>								
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.6	3 6 8 13					54.0				0.0 - 7.1 ft: FILL.	Complete borehole number is B3890R244. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	13 11 10 7					52.4 52.0				0.0 - 2.4 ft: Sandy Silt; Brownish black (5YR2/1) to Dark reddish brown (10R3/4), fine to medium grained, silt -60-70%, sand -30-40%, no plasticity, moist.	
SS	2.0	1.7	4 7 11 18					50.4 50.0				2.4 - 7.1 ft: Clayey Silt; Grayish black (N2) with Dark reddish brown (10R3/4) streaks below 4.0', silt -70%, clay -10%, sand -10%, and coal -10%, changing to coal -50%, sand -40%, clay -10% at 4.0'; no plasticity, moist.	
SS	2.0	1.9	12 20 23 26					48.3 48.0					
SS	2.0	1.4	10 13 17 18					46.9 46.1 46.0				7.1 - 9.4 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, no plasticity, moist; changing to Sandstone at 9.2', micaceous, thin bedded, blocky, iron-oxide cement.	
								44.6 44.0					
										TOTAL DEPTH = 10.0 FT.		Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
												* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE			Stepan Property			Last Update: 03-19-92	HOLE NO. R244		



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R245**

SITE: **Stepan Property** COORDINATES: **N 9600.0; E 10100.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-5-90** COMPLETED: **10-5-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **2.2** ROCK (FT.): **0.0** TOTAL DEPTH: **2.2**

CORE RECOVERY (FT./%) **1.5/68*** CORE BOXES: **0** SAMPLES: **2** EL. TOP CASING: **NA** GROUND EL.: **60.0** DEPTH/EL. GROUND WATER: **NA/NA** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.						
							60.0					
SS	1.5	1.3	20 33 45				59.8 59.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R245. Note: hole was originally numbered B3890R144. Augered through asphalt to 0.5' Borehole sampled by TMA/Eberline Corp. Augered to 2.0'. Spoon refusal at 2.2'. Hole abandoned and backfilled with drilling spoils.
SS	0.2	0.2	60/3				58.2 58.0 57.8				0.5 - 2.2 ft: FILL; Sand; Light Olive (10Y5/4) changing to Dark yellowish brown (10YR4/2) at 2.1'; rounded medium grains, well sorted, moderately dense; with brick fragments, glass and clay at 2.1'; moist.	
											TOTAL DEPTH = 2.2 FT.	

(Template: HYWD)

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R245**

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R246
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9253.0; E 10010.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-14-90	11-14-90	Hydro Group, Inc.	Mobile B-80		8"	9.4	2.6	12.0		
CORE RECOVERY (FT./X)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
8.5/71*		0	6	NA	54.0	V / NA		9.4/44.6		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.						
SS	2.0	1.8	5 10 15 17			54.0				0.0 - 4.4 ft: FILL; Clayey Silt to Silty Clay; Moderate brown (5YR4/4 to 5YR3/4 at 2.0') changing to Dark yellowish brown (10YR4/2) at 4.3'; silt -60% decreasing with depth, sand -30%, clay -10% increasing to -70% below 4.3'; some brick fragments, no to medium plasticity, moist.	Complete borehole number is B3890R246.
SS	2.0	1.3	11 18 15 20			52.2 52.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.4	7 5 1 11			50.7 50.0 49.6	5				
SS	2.0	1.9	6 18 13 25			48.0				6.0 - 9.4 ft: SAND, (SP); Grayish black (N2); medium, rounded to subrounded grains; well sorted, no plasticity, wet.	
SS	1.5	1.5	7 30 50/6"			46.1 46.0					
SS	2.0	1.6	5 13 17 35			44.6 44.5 44.0	10			9.4 - 11.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4); with sandstone cobbles, weathered, fine grained, iron-oxide cement, blocky, micaceous; moist.	Spoon refusal at 9.5'. Augered to 10.0'
						42.4 42.0				TOTAL DEPTH = 12.0 FT.	Augered to total depth of 12.0'. 3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R246
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R247

SITE

Stepan Property

COORDINATES

N 9478.0; E 10300.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN

11-14-90

COMPLETED

11-14-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

11.3

ROCK (FT.)

0.5

TOTAL DEPTH

11.8

CORE RECOVERY (FT./%)

8.9/75*

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

NA

NA

DEPTH/EL. TOP OF ROCK

11.3/45.7

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	P.S.I.	TIME MIN.						
SS	2.0	1.6	18 23 19 7				57.0				(Template: MYMD)	
SS	2.0	1.9	6 6 5 3				55.4 55.0				0.0 - 4.8 ft: FILL; Gravelly Silt, Dark yellowish brown (10YR4/2) changing to Light brown (5YR5/6) at 2.0' and to Moderate brown (5YR3/4) at 3.0'; fine grains to gravel size, silt -70%, gravel -30%; with coal and slag -60% at 0.8'; moist.	Complete borehole number is B3890R247. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	3 2 1 2				53.1 53.0 52.2				4.8 - 9.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), with Dark yellowish orange (10YR6/6) between 4.8 - 6.4', changing to Moderate yellowish brown (10YR5/4) at 8.7'; fine grained, silt -70%, sand -10-20%, clay -10-20%, clayey below 8.7'; no plasticity, moist.	
SS	2.0	1.1	1 1 7 9				51.6 51.0 49.9	5				
SS	1.9	1.5	9 13 19 50/5"				49.0 48.3 48.0 47.5				9.0 - 11.3 ft: SAND, (SP); Dark yellowish brown (10YR4/2) changing to Brownish gray (5YR4/1) at 10.0', medium to coarse grains, well sorted, no plasticity, moist.	Spoon refusal at 9.9'. Augered to 10.0'
SS	1.4	1.4	9 35 50/5"				47.0 45.7 45.6 45.2	10			11.3 - 11.4 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -70%, sand -20%, clay -10%, low plasticity.	Spoon refusal at 11.4'. Auger refusal at 11.8'. 3" PVC casing inserted to 11.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
TOTAL DEPTH = 11.8 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.
R247



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R248

SITE

Stepan Property

COORDINATES

N 9480.0; E 10380.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN

11-14-90

COMPLETED

11-14-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL
Mobile B-80

SIZE
8"

OVERBURDEN
7.3

ROCK (FT.)
2.7

TOTAL DEPTH
10.0

CORE RECOVERY (FT./%)
7.7/77*

CORE BOXES
0

SAMPLES
5

EL. TOP CASING
NA

GROUND EL.
57.0

DEPTH/EL. GROUND WATER
/ NA

DEPTH/EL. TOP OF ROCK
7.3/49.7

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH
none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.5	1.2	20 18 50/8"		57.0			0.0 - 4.6 ft: FILL; Gravelly Silt; Olive black (5Y2/1) and Medium light gray (N6) changing to Grayish black (N2) at 0.8' and to Dark yellowish brown (10YR4/2) at 2.0', fine grains to gravel size, silt -50%, coal -30%, clay -20%; with slag below 2.0'; no plasticity.	Complete borehole number is B3890R248. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 1.5'. Augered to 2.0'
SS	2.0	1.8	20 10 7 7		55.8 55.0				
SS	2.0	1.2	3 2 1 2		53.2 53.0 52.4	5	4.6 - 6.4 ft: Silty CLAY, (CL); Olive gray (5Y4/1), very fine grained, clay -70%, silt -30%, medium plasticity, wet.		
SS	2.0	1.8	3 7 10 13		51.0 50.6		6.4 - 7.3 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2), fine to medium grained, silt -60%, sand -20%, clay -20%, low plasticity, wet.		
SS	1.9	1.7	7 37 40 50/5"		49.7 49.2 49.0		7.3 - 9.7 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, low plasticity; weathered sandstone at 8.9', thin bedded, micaceous.		
					47.3 47.0	10		TOTAL DEPTH = 10.0 FT.	Spoon refusal at 9.9'. Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R248



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R249

SITE

Stepan Property

COORDINATES

N 9477.0; E 10201.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-14-90

COMPLETED

11-14-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

1.2

ROCK (FT.)

2.8

TOTAL DEPTH

4.0

CORE RECOVERY (FT./%)

3.2/80*

CORE BOXES

0

SAMPLES

2

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

1.2/56.8

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. AND TYPE	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS % CORE RECOVERY	LOSS IN G.P.M.	WATER TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	8 12 13 15				58.0				(Template: MYWD)	
							56.8 56.5 56.0				0.0 - 1.2 ft: FILL; Sandy silt, Moderate brown (5YR3/4) changing to slag and silt, Grayish black (N2) and Very pale orange (10YR8/2) at 0.4' fine to coarse grained.	Complete borehole number is B3890R249.
SS	2.0	1.7	6 7 15 20				54.3 54.0				1.2 - 3.7 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, no plasticity, moist; with Sandstone, blocky, micaceous, very fine grained at 3.4'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
TOTAL DEPTH = 4.0 FT.											Augered to total depth of 4.0'. 3" PVC casing inserted to 3.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.	

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R249



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R250			
Stepan Property				N 9440.0; E 10300.0		Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-14-90	11-14-90	Hydro Group, Inc.	Mobile B-80		8"	6.0	4.0	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.4/54*		0	5	NA	56.0	/ NA		6.0/50.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in		none		Robert Cook							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: HYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
										DESCRIPTION AND CLASSIFICATION	
SS	2.0	1.3	10 22 11 9				56.0			0.0 - 3.4 ft: FILL; Silty Gravel, Olive gray (5Y3/2) to Moderate brown (5Y4/4), fine to coarse grained, gravel -60%, silt -40%; changing to silt and slag, Grayish black (N2) spotted with -10-20% White (N9) at 0.5', fine to coarse grained.	Complete borehole number is B3890R250. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	4 5 6				54.7 54.0			3.4 - 3.6 ft: SILT, (ML); Light brown (5YR5/6), very fine grained, no plasticity, dry.	
SS	2.0	0.5	4 1/12"				52.6 52.4 52.0 51.5	5		4.0 - 4.5 ft: Gravelly SAND, (SW); Olive gray (5Y4/1); angular, tabular, medium to coarse grains; sand -60%, gravel -30%, silt -10%.	
SS	2.0	0.6	1 4 6 21				50.0 49.4			6.0 - 9.4 ft: Sandy SILT, (ML); Grayish red (10R4/2), very fine to fine grained, silt -70%, sand -30%, no plasticity, wet; with sandstone, Dark reddish brown (10R3/4), mottled, fine grained, blocky, iron-oxide cement below 8.7'.	
SS	2.0	1.4	10 21 36 50				48.0 46.6 46.0			TOTAL DEPTH = 10.0 FT.	
								10			
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R250	



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R251

SITE

Stepan Property

COORDINATES

N 9440.0; E 10380.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-14-90

COMPLETED

11-14-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.0

ROCK (FT.)

0.0

TOTAL DEPTH

4.0

CORE RECOVERY (FT./%)

2.5/62*

CORE BOXES

0

SAMPLES

2

EL. TOP CASING

NA

GROUND EL.

56.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

NA / NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYWD)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.3	9 13 19 30				56.0				0.0 - 3.2 ft: FILL; Sandy Silt; Moderate brown (5YR4/4 to 5YR3/4) changing to Dark reddish brown (10R3/4) at 0.8', fine grained, silt -70%, sand -30%; with sandstone gravel, blocky, iron-oxide cement, micaceous, Between 1.2 - 2.6'; changing to slag and coal, Grayish black (N2), fine to coarse grain, coal -80%, slag -15% at 2.6'; no plasticity, moist.	Complete borehole number is B3890R251.
SS	2.0	1.2	19 13 12 9				54.7 54.0 52.8 52.0				TOTAL DEPTH = 4.0 FT.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Over 80 ppm in breathing zone; drilling terminated by Eberline at 4.0'. 3" PVC casing inserted to 3.6, for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; HQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R251



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R253

SITE

Stepan Property

COORDINATES

N 9,248.0; E 10,148.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

COMPLETED

DRILLER

DRILL MAKE AND MODEL

SIZE

OVERBURDEN

ROCK (FT.)

TOTAL DEPTH

11-15-90

11-15-90

Hydro Group, Inc.

Mobile B-80

8"

7.3

0.0

7.3

CORE RECOVERY (FT./%)

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

3.6/49*

0

5

NA

54.0

↓ / NA
↓ / NA

NA/NA

SAMPLE HAMMER WEIGHT/FALL

CASING LEFT IN HOLE: DIA./LENGTH

LOGGED BY:

140 lbs/30 in

none

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	1.0	0.7	5 / 50/6"				54.0			(Template: MYWD)	
							53.3			0.0 - 3.5 ft: FILL; Gravelly Silt; Moderate brown (5YR3/4), with sulphur, brick and concrete fragments.	Complete borehole number is B3890R253.
SS	2.0	1.5	5 / 20 / 22 / 25				52.0				Borehole sampled and gamma-logged by TMA/Eberline Corp.
							50.5				Spoon refusal at 1.0'.
SS	0.9	0.9	12 / 50/5"				50.0			4.0 - 4.9 ft: SILT, (ML); Pale Brown (5YR5/2), moist.	Augered to 2.0' Spoon refusal at 4.9'.
							49.1	5			Augered to 6.0' Spoon refusal at 6.4'.
SS	0.4	0.3	50/5"				48.0			6.0 - 7.3 ft: GRAVEL, (GW); Light olive gray (5Y5/2) changing to Light greenish gray (5G8/1) at 7.0', sandstone, medium grained, subrounded.	Suspected boulder at -6'.
							47.7				Augered to 7.0' Spoon refusal at 7.2'.
							47.0				Auger refusal at 7.3'.
							46.8				3" PVC casing inserted to 7.0' for gamma-logging.
							46.7				PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
										TOTAL DEPTH = 7.3 FT.	

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 10-05-92

HOLE NO. R253



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE Stepan Property										COORDINATES N 9686.0; E 10748.0		14501	1 OF 1	R254			
BEGUN 11-15-90	COMPLETED 11-15-90	DRILLER Hydro Group, Inc.			DRILL MAKE AND MODEL Mobile B-80		SIZE 8/3"	OVERBURDEN 12.0	ROCK (FT.) 3.2	TOTAL DEPTH 15.2	ANGLE FROM HORIZ Vertical		BEARING -----				
CORE RECOVERY (FT./%) 1.6/50*		CORE BOXES 0	SAMPLES 1	EL. TOP CASING NA	GROUND EL. 66.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK 12.0 / 54.0			SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook	
SAMP. TYPE SAMP. DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION			NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.				
							66.0			0.0 - 12.0 ft: FILL ; Sandy Silt covering Sludge.			Complete borehole number is B3890R254. See Borehole R160 for lithology between 0.0 - 12.0'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered directly to 12.0'.				
NQ	3.2	1.6	na				54.0			12.0 - 13.6 ft: SANDSTONE ; Dark reddish brown (10R3/4), blocky, iron-oxide cement, micaceous; fine, rounded to subrounded grains.			Rock cored hole to total depth of 15.2' 3" PVC casing inserted for gamma-logging.				
							52.4										
							50.8	15		TOTAL DEPTH = 15.2 FT.			PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).				

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

Stepan Property

Last Update:
03-19-92

HOLE NO.
R254



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. C255
SITE Stepan Property		COORDINATES N 9724.0; E 10822.0			ANGLE FROM HORIZ Vertical	
BEGUN 11-15-90	COMPLETED 11-15-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8" / 3"	OVERBURDEN 17.0	ROCK (FT.) 3.2
CORE RECOVERY (FT./%) 7.4/37*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 65.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook		

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.1	2 18 23 22				65.0		0.0 - 13.6 ft: FILL.	Complete borehole number is B3890C255. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole was not continuously sampled; Hole R143 (3' east) was continuously sampled to 16.7'. Augered from 2.0' to 6.0' without sampling. Augered from 6.0' to 12.0' without sampling. Augered from 14.0' to refusal at 17.0' without sampling. Core barrel sampled from 17.0 - 20.2'. Gamma-logging completed through augers to 15.0' and in open 3" borehole below 15.5'. Augers were removed after logging; hole was backfilled with grout and drilling spoils.	
							63.9		0.0 - 4.6 ft: Sandy Silt, Moderate brown (5YR3/4) changing to Dark reddish brown (10R3/4), fine to medium grains, silt -70%, sand -25%, gravel -5%, no plasticity, moist.		
SS	2.0	2.0	5 6 5 5				61.0	5	4.6 - 13.6 ft: Sludge; Dark gray (N3) to Very light gray (N8), conglomerated mixture swirled together resembling a marble layer cake; clayey, very fine grains with some medium grains below 12.0', soft.		
							59.0				
							10				
SS	2.0	1.6	4 4 4 3				53.0				
							51.4				
							15				
NQ	3.2	2.7	na				48.0		17.0 - 19.7 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, micaceous.		
							45.3				
							44.8	20			
TOTAL DEPTH = 20.2 FT.										* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. C255
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GEOLOGIC DRILL LOG

PROJECT: **FUSRAP**
 JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R256**

SITE: **Stepan Property** COORDINATES: **N 9640.0; E 9800.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-4-90** COMPLETED: **12-4-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Soil Sentry** SIZE: **8"** OVERBURDEN: **8.0** ROCK (FT.): **2.0** TOTAL DEPTH: **10.0**

CORE RECOVERY (FT./%): **6.1/61*** CORE BOXES: **0** SAMPLES: **5** EL. TOP CASING: **NA** GROUND EL.: **57.0** DEPTH/EL. GROUND WATER: **5' / -5' ATD** DEPTH/EL. TOP OF ROCK: **8.0/49.0**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.4	5					57.0					
			4					55.6				0.0 - 2.2 ft: FILL; Silty Sand mixed with slag; sand is Very dusky red (10R2/2), loose, wet; slag is Black (N1) with White (N9), salt and pepper texture, coarse sand to fine gravel size, hard, loose.	Complete borehole number is B3890R256.
SS	0.9	0.2	45					55.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
			50/5"					54.8					Spoon refusal at 2.9'.
SS	2.0	1.6	5					53.0					
			7					52.2				4.0 - 4.8 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained, moderately sorted, moderately firm, wet.	Augered to 4.0'.
			7					51.4					
SS	2.0	1.6	6					51.0				4.8 - 7.6 ft: Gravelly, Silty SAND, (SM); Blackish red (5R2/2) with areas of Black (N1); sand is fine grained, poorly sorted; gravel is sandstone, content decreasing with depth; firm, moist.	
			6					49.4					
			10					49.0					
SS	2.0	1.3	6					47.7				8.0 - 9.3 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R5/4) with some Blackish red (5R2/2); sand is fine grained, poorly sorted, gravel is sandstone, firm, moist.	Augered to 8.0'.
			11					47.0					
			21										
			25										
									10			TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to 8.6' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R256**



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R257

SITE

Stepan Property

COORDINATES

N 9700.0; E 9850.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-4-90

COMPLETED

12-5-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

8.0

ROCK (FT.)

4.0

TOTAL DEPTH

12.0

CORE RECOVERY (FT./%)

7.6/63*

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

8.0/50.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.5	3 3 4 5				58.0				0.0 - 4.5 ft: FILL; Sandy silt; Grayish brown (5YR3/2) changing to Dusky brown (5YR2/2) at 0.5', silt -70%, sand -30%, no plasticity; changing to cinders and slag at 2.9'. Dark yellowish orange (10YR6/6) to Light gray (N7) to Grayish black (N2), with silt -20%; sandy silt and concrete below 4.0'.	Complete borehole number is B3890R257.
SS	2.0	1.6	21 18 14 11				56.5 56.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.5	6 4 8 6				54.4 54.0 53.5	5				
SS	2.0	2.0	4 11 18 23				52.0				6.0 - 7.3 ft: Silty SAND, (SM); Moderate brown (5YR3/4) changing to Dusky yellowish brown (10YR2/2) at 6.6', medium grained, sand -80%, silt -20%, no plasticity.	
SS	2.0	1.3	12 21 32 46				50.0				7.3 - 8.0 ft: Sandy SILT, (ML); Grayish brown (5YR3/2), medium grained, silt -60%, sand -40%, no plasticity.	
SS	2.0	0.7	13 16 21 30				48.7 48.0 47.3	10			8.0 - 10.7 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), silt -70%, clay -20%, sand -10%, no plasticity, moist; changing to Sandstone, Dusky red (5R3/4), medium grained, blocky, brittle, at 8.7'.	Stopped drilling on 12/4 because of rain. Resumed drilling on 12/5.
TOTAL DEPTH = 12.0 FT.											Augered to total depth of 12.0'. 3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
											* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

R257



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R258

SITE

Stepan Property

COORDINATES

N 9700.0; E 10035.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-5-90

COMPLETED

12-5-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

10.5

ROCK (FT.)

1.5

TOTAL DEPTH

12.0

CORE RECOVERY (FT./%)

8.6/72*

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

10.5/47.5

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYWD)

DESCRIPTION AND CLASSIFICATION

NOTES ON:
WATER LEVELS,
WATER RETURN,
CHARACTER OF
DRILLING, ETC.

Complete borehole
number is
B3890R258.

Borehole sampled and
gamma-logged by
TMA/Eberline Corp.

0.0 - 5.3 ft: **FILL.**
0.0 - 1.6 ft: Sandy silt, Olive gray (5Y4/1) changing to Moderate reddish brown (10R4/8) at 0.5' and to Grayish black (N2) at 1.3', fine to medium grained, silt -70-90%, sand -0-30%, clay -10%, no plasticity, moist.
2.0 - 5.3 ft: Gravel, cinders, slag, silt and brick fragments, Moderate yellowish brown (10YR5/4) to Gray black (N2) to Medium Gray (N5), wet; layer of silty sand between 4.7 - 5.0', Moderate brown (5YR4/4), fine grained, sand -80%, silt -20%, moist.

6.0 - 10.5 ft: **Clayey SILT, (ML);** Dark reddish brown (10R3/4), fine grained, silt -70%, clay -30%, low plasticity; changing to Grayish yellow green (5GY7/2), very fine grain, no plasticity, below 10.3'; moist.

10.5 - 11.4 ft: **Clayey SILT, (ML);** Dark reddish brown (10R3/4), very fine to medium grained, silt -60%, clay -30%, sand -10%, no plasticity, moist.

TOTAL DEPTH = 12.0 FT.

Augered to total
depth of 12.0'.

3" PVC casing
inserted for
gamma-logging.

PVC casing was
removed after
logging; hole was
backfilled with grout
and drilling spoils.

* Core recovery refers
to total rock & soil
sample.

Ground elevation
estimated from site
topographic map.

Description &
classification by
visual examination of
sample.

Colors from
"Rock-Color Chart"
(GSA, 1948).

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLKS CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE
				LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.			
SS	2.0	1.6	21 24 23 27				58.0		
SS	2.0	2.0	16 14 15 16				56.4 56.0		
SS	2.0	1.3	9 6 3 1				52.7	5	
SS	2.0	1.4	3 4 4 5				52.0		
SS	2.0	0.9	3 6 11 17				50.6 50.0		
SS	2.0	1.4	5 9 10 22				49.1 48.0 47.5	10	
							46.6 46.0		

SS = SPLIT SPOON; HQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R258



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO. 14501

SHEET NO. 1 OF 1

HOLE NO. R259

SITE

Stepan Property

COORDINATES

N 9722.0; E 10012.0

ANGLE FROM HORIZ. BEARING

Vertical

BEGUN

12-5-90

COMPLETED

12-5-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

10.7

ROCK (FT.)

2.3

TOTAL DEPTH

13.0

CORE RECOVERY (FT./%)

8.7/67*

CORE BOXES

0

SAMPLES

7

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

10.7/47.3

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYMD)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOCKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						P.S.T.	TIME MIN.						
SS	2.0	1.6	9					58.0				0.0 - 5.0 ft: FILL; Silty Gravel; Moderate brown (5YR3/4), silt -70%, sand -15%, gravel -15%, moist; changing to Silt, Grayish black (N2), at 1.2', fine to medium grained with trace gravel, silt -60%, coal -30%, sand -10%; sulphur, Pale yellowish orange (10YR8/6) between 2.5 - 2.7'; concrete and brick fragments between 2.7 - 2.9'; silt, cinders, coal and sand, Dark yellowish orange (10YR6/6) and Grayish black (N2), wet, below 2.9'.	Complete borehole number is B3890R259. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	25					56.4				6.0 - 9.0 ft: Silty CLAY to Sandy CLAY, (CL); Light olive gray (5Y6/1), very fine grained, clay -70%, silt -30%; changing to Grayish red (5R4/2) at 7.0', fine to medium grained, clay -70%, sand -20%, silt -10%; medium plasticity, moist to wet.	Augered to 12.0' Spoon refusal at 13.0'. Augered to total depth of 13.0'.
SS	2.0	1.0	19				56.0						
SS	2.0	1.0	14					55.0				9.0 - 10.7 ft: Silty SAND, (SM); Pale brown (5YR5/2), medium grains with trace fine grains, well sorted, sand -80%, silt -20%; changing to Olive black (5Y2/1), fine to medium grains, sand -60%, silt -20%, clay -20%, low plasticity, at 10.2'; moist.	3" PVC casing inserted to 12.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	2.0	1.0	7				54.0						
SS	2.0	1.0	5					54.0				10.7 - 12.9 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, iron-oxide cement, blocky.	* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.0	2				53.0						
SS	2.0	1.5	1					52.0				TOTAL DEPTH = 13.0 FT.	HOLE NO. R259
SS	2.0	1.5	4				50.5						
SS	2.0	1.5	6					50.0					
SS	2.0	1.2	3					49.0					
SS	2.0	1.2	11					48.5					
SS	2.0	1.2	8					48.0					
SS	2.0	1.2	17					47.3					
SS	2.0	1.2	18					46.8					
SS	1.0	0.9	22					46.0					
			50/6"					45.1					
								45.0					

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; 0 = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R259



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R260

SITE

Stepan Property

COORDINATES

N 9741.0; E 10012.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-5-90

COMPLETED

12-5-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

12.5

ROCK (FT.)

1.5

TOTAL DEPTH

14.0

CORE RECOVERY (FT./%)

10.5/75*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

12.5/45.5

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.9	10 23 28				58.0		0.0 - 5.7 ft: FILL. 0.0 - 0.9 ft: Sandy Silt; Moderate brown (5YR3/4), fine to medium grained; brick fragment between 0.7 - 0.9'.	Complete borehole number is B3890R260.	
SS	2.0	1.7	19 9 10 18				56.1 56.0		0.9 - 2.2 ft: Gravel, cinders and coal; mixture of Grayish black (N2), Medium light gray (N6), Dark yellowish orange (10YR6/6), and very Light gray (N8).	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.7	17 10 8 6				54.3 54.0	5	2.2 - 4.5 ft: Sludge; Bluish white (5B9/1) changing to Very light gray (N8) interlayered with Grayish black (N2) at 2.4'; silty to clayey. 4.5 - 5.7 ft: Gravel and cinders, Black (N1), fine grains to pebbles up to 1 cm, unconsolidated, loose, wet.		
SS	2.0	1.4	2 1 2 1				52.3 52.0		6.0 - 8.7 ft: Clayey SILT to Sandy SILT (ML); Very light gray (N8), very fine grained; changing to Dark yellowish brown (10YR4/2), very fine to fine grain, silt -70%, sand -20%, clay -10%, at 6.7'; no plasticity, moist; layer of Silty Peat, Grayish black (N2), silt -20%, grainy, fibrous, between 6.3 - 6.7'.		
SS	2.0	1.1	2 5 10 27				50.6 50.0 49.3 48.9		8.7 - 12.5 ft: SAND to Silty SAND (SP-SM); Black (N1), medium grained, well sorted, subrounded to subangular grains, no plasticity; changing to banded Moderate brown (5YR3/4) and Grayish olive green (5GY3/2), sand -70%, silt -30% at 12.2'; moist.		
SS	2.0	1.5	10 16 22 21				48.0 46.5 46.0	10			
SS	2.0	1.2	13 22 36 30				45.5 44.8		12.5 - 13.2 ft: SANDSTONE; Dark reddish brown (10R3/4), medium grained, blocky, iron-oxide cement.	Augered to total depth of 14.0'. 3" PVC casing inserted to 14.0' for gamma-logging.	
							44.0		TOTAL DEPTH = 14.0 FT.	PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92HOLE NO.
R260



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R261**

SITE: **Stepan Property** COORDINATES: **N 9600.0; E 10012.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-6-90** COMPLETED: **12-6-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **2.5** ROCK (FT.): **2.7** TOTAL DEPTH: **5.2**

CORE RECOVERY (FT./%): **4.3/83*** CORE BOXES: **0** SAMPLES: **3** EL. TOP CASING: **NA** GROUND EL.: **59.0** DEPTH/EL. GROUND WATER: **NA / NA** DEPTH/EL. TOP OF ROCK: **2.5/56.5**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE ESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.2	9 24 21 29				59.0					Complete borehole number is B3890R261. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 5.0'. - Recovery in last spoon was > recorded interval; driven; i.e. sample to 5.2'. Augered to 5.0'. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
							57.8			0.0 - 2.5 ft: FILL ; Sand and gravel, with brick fragments, Moderate brown (5YR3/4), moist.		
SS	2.0	1.9	27 18 17 21				57.0 56.5			2.5 - 5.2 ft: Clayey SILT (ML) ; Moderate reddish brown (10R4/6), fine grained, silt -70%, clay -30%. no plasticity, moist.		
SS	1.0	1.2	19 50/-6"				55.1 55.0					
							53.8	5			TOTAL DEPTH = 5.2 FT.	

(Template: MYWD)

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO. **R261**



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R262**

SITE: **Stepan Property** COORDINATES: **N 9550.0; E 10100.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-6-90** COMPLETED: **12-6-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Soil Sentry** SIZE: **3.5"** OVERBURDEN: **2.7** ROCK (FT.): **4.4** TOTAL DEPTH: **7.1**

CORE RECOVERY (FT./%): **3.1/44*** CORE BOXES: **0** SAMPLES: **4** SEL. TOP CASING: **NA** GROUND EL.: **59.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **2.7/56.3**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.						
								59.0					
SS	2.0	1.3	12	18				58.3				0.0 - 0.7 ft: CONCRETE.	Complete borehole number is B3890R262. Cut concrete with 6" core barrel to 0.7'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
			18	19				57.3				0.7 - 1.7 ft: Sandy GRAVEL, (GS); Dark gray (NS) to Black (N1), loose, moist.	
			21					57.0				1.7 - 2.0 ft: Gravelly, Silty SAND, (SM); Dusky red (5R3/4), sand is fine to medium grained, poorly sorted, firm, slightly moist.	
SS	2.0	0.9	18	18				56.3				2.7 - 7.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted; gravel is sandstone, angular; firm, moist.	
			18	25				55.4					
SS	2.0	0.6	21	23				54.3					
			25	29				53.7	5				
SS	0.4	0.3	50/5"					52.3					
								52.0					
								51.9					
TOTAL DEPTH = 7.1 FT.												Spoon refusal at 7.1'. Borehole enlarged by driving 3.5' OD split spoon to depth. PVC casing could not be inserted below 5.0'. PVC casing removed and gamma-logging completed in open hole. Hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R262**
 HX = HAND AUGER; 0 = OTHER



GEOLOGIC DRILL LOG										PROJECT	JOB NO.	SHEET NO.	HOLE NO.	
SITE										COORDINATES		ANGLE FROM HORIZ		BEARING
Stepan Property										N 9850.0; E 10444.0		Vertical		-----
BEGUN	COMPLETED	DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
12-6-90	12-6-90	Hydro Group, Inc.			Mobile B-80		8"	0.4	5.6	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
4.3/72*		0	3	NA	66.0	/ NA		0.4/5.6						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:								
140 lbs/30 in		none				Robert Cook								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LOSS % CORE RECOVERY	WATER LOSS G.P.M.	PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
SS	2.0	1.6	3 5 7 4				66.0 65.6			0.0 - 0.4 ft: FILL, Grass, sand, silt, cinders and slag.	Complete borehole number is B3890R263.			
SS	2.0	0.9	1 2 2 3				64.4 64.0 63.1			0.4 - 5.8 ft: Clayey, Sandy SILT, (ML); Moderate reddish brown (10R4/6), very fine to fine grained, silt -80%, sand -10%, clay -10%, moist; very hard, trace sandstone, mostly weathered, below 4.0'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.			
SS	2.0	1.8	6 9 21 27				62.0 60.2 60.0	5						
TOTAL DEPTH = 6.0 FT.										Augered to total depth of 6.0'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.				
										* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).				

SS = SPLIT SPOON; NO = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R263



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R264

SITE

Stepan Property

COORDINATES

N 9600.0; E 10051.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN
12-6-90

COMPLETED
12-6-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

0.6

ROCK (FT.)

2.4

TOTAL DEPTH

3.0

CORE RECOVERY (FT./%)
2.4/80*

CORE BOXES

0

SAMPLES

2

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

0.6/57.4

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.7	15 16 19 37					58.0				0.0 - 0.6 ft: TOPSOIL; Grass, sand, silt and gravel; Dark yellowish brown (10YR4/2).	Complete borehole number is B3890R264. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 2.5'. - Recovery in last spoon was > recorded interval driven; i.e. sample to 2.7'. Auger refusal at 3.0'. 3" PVC casing inserted to 2.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
								57.4				0.6 - 2.7 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -80%, sand -10%, clay -10%, no plasticity; changing to Sandstone, fine grained, blocky, iron-oxide cement, below 2.5'.	
SS	0.5	0.7	50/-6"					56.3					
								55.3					
								55.0					
TOTAL DEPTH = 3.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R264



GEOLOGIC DRILL LOG										PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
SITE Stepan Property										COORDINATES N 9600.0; E 10069.0				ANGLE FROM HORIZ Vertical		BEARING -----	
BEGUN	COMPLETED	DRILLER			DRILL MAKE AND MODEL			SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
12-6-90	12-6-90	Hydro Group, Inc.			Mobile B-80			8"	2.0	0.0	2.0						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK									
1.7/85*		0	1	NA	58.0	/ NA / NA		NA/NA									
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:											
140 lbs/30 in			none			Robert Cook											
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.				
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.										
SS	2.0	1.7	7 14 29 50					58.0 56.3 56.0				(Template: MYWD) 0.0 - 1.7 ft: FILL, Grass, sand and silt; Dark yellowish brown (10YR4/2) changing to Dark reddish brown (10R3/4) at 0.3', fine grained, silt -80%, clay -10%, sand -10%, some roots, moist; mixed with coal and concrete fragments, Grayish black (N2), below 0.7'. TOTAL DEPTH = 2.0 FT.	Complete borehole number is B3890R265. Borehole sampled and gamma-logged by TMA/Eberline Corp. Auger refusal at 2.0'. 3" PVC casing inserted to 2.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.				

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update:
03-19-92

HOLE NO.
R265



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	C266				
Stepan Property				N 9732.0; E 10464.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
12-10-90	12-10-90	Hydro Group, Inc.	Soil Sentry		8"	4.0	6.2	10.2				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.9/68*		0	7	NA	64.0	V / none ATD / NA		4.0/60.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.7	1 2 5 7				64.0			0.0 - 1.5 ft: FILL; Silty Sand, Black (N1), sand is fine grained, moderately sorted, minor roots; changing to Sandy Gravel with slag, Grayish black (N2), at 0.9', gravel is fine; loose, slightly moist.	Complete borehole number is B3890C266.	
SS	2.0	1.4	3 4 5 8				62.5 62.3 62.0			1.5 - 3.4 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), sand is fine grained, moderately sorted; minor sandstone gravel, content increases with depth; firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. na - hammer hitting rig; spoon stopped at 4.5'. Augered to 4.5'. Spoon refusal at 6.0'. Augered to 6.0'. Spoon refusal at 6.2'. Augered to 6.5'. Augered to 8.5'. Spoon refusal at 10.2'. Augered to 10.2'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging; hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.	
SS	0.5	0.4	na				60.6 60.0			4.0 - 9.5 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted, gravel is sandstone, firm, moist.		
SS	1.5	1.2	17 25 50/6"				59.6 59.5	5				
SS	0.2	0.0	50/3"				58.3					
SS	2.0	1.2	37 38 36 34				57.5					
SS	1.7	1.0	25 27 35 50/3"				56.3 55.5					
							54.5					
							53.8	10				
TOTAL DEPTH = 10.2 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
C266



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R267					
Stepan Property				N 9700.0; E 9985.0		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
12-10-90	12-10-90	Hydro Group, Inc.	Mobile B-80	8"	3.0	2.4	5.4						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK						
4.3/80*		0	4	NA	58.0	V / NA	3.0/55.0						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook								
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	5 10 12 18					58.0				(Template: MYWD) 0.0 - 3.0 ft: FILL; Sandy Silt, Moderate brown (5YR3/4), silt -70%, sand -20%, clay -10%, no plasticity, moist; changing to coal and cinders, Grayish black (N2), at 1.2'. 3.0 - 5.2 ft: Clayey, Sandy SILT, (ML); Dark reddish brown (10R3/4), silt -60%, sand -20%, clay -20%, moist; changing to Sandstone, fine grained, weathered, blocky, micaceous, iron-oxide cement below 4.5'. TOTAL DEPTH = 5.4 FT.	Complete borehole number is B3890R267. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 5.0'. - Recovery in spoon was > recorded interval driven; i.e. sample to 5.2'. Augered to 5.2'. Spoon refusal at 5.4'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
SS	2.0	1.5	6 8 7 5				56.4 56.0						
SS	1.0	1.2	11 50/-6"				55.0 54.5 54.0						
SS	0.2	0.0	50/3"				52.8 52.0	5					
* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).													
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property			Last Update: 03-19-92		HOLE NO. R267		



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R268
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9600.0; E 10135.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-10-90	12-10-90	Hydro Group, Inc.	Mobile B-80	8"	16.0	0.0	16.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.8/30*		0	8	NA	60.0	NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
								60.0				0.0 - 1.0 ft: CONCRETE.	Complete borehole number is BS890R268. Cored concrete to 1.0'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Excessive water in sampler at 4.0'. Driller stated "material at 6.0' is unrecoverable". Excessive water coming out of sampler at 12.0'. Drove 3" PVC casing to bottom of hole for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
SS	1.0	0.4	16	21				59.0				1.0 - 15.4 ft: FILL.	
SS	2.0	0.1	25	11				58.0				1.0 - 2.1 ft: Cinders, coal, concrete fragments and debris; Grayish black (N2).	
			7	5				57.9					
SS	2.0	1.3	3	2				56.0				4.0 - 5.3 ft: Gravel, sand, and silt, Moderate brown (5YR3/4), fine to very coarse grained, moist.	
			2	2				54.7	5				
SS	2.0	0.1	18	13				54.0				6.0 - 6.1 ft: Sandstone Cobble, dark reddish brown (10R3/4).	
			7	6				53.9					
SS	2.0	0.2	6	2				52.0				8.0 - 8.2 ft: Sandstone Cobble, dark reddish brown (10R3/4).	
			1	2				51.8					
SS	2.0	0.0	2/24"						10				
								48.0				12.0 - 13.3 ft: Gravel, sand and silt, Dark reddish brown (10R3/4), wet.	
SS	2.0	1.3	9	13				46.7					
			23	21				46.0				14.0 - 15.4 ft: Gravel, sand and silt, Grayish brown (5YR3/2), wet.	
SS	2.0	1.4	9	10				44.6	15				
			12	15				44.0					
TOTAL DEPTH = 16.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R268
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	C269				
SITE			COORDINATES				ANGLE FROM HORIZ	BEARING				
Stepan Property			N 9736.0; E 10459.0				Vertical	-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-10-90	12-10-90	Hydro Group, Inc.		Soil Sentry		8"	2.6	5.2	7.8			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
5.3/68*		0	6	NA	64.0	/ none ATD / NA		2.6/61.4				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.8	5 11 8 9				64.0				(Template: MYWD)	
							62.8				0.0 - 1.2 ft: FILL; Black (N1), Silty Sand changing to fine gravel-sized Slag at 0.7', sand is fine grained, minor roots, loose, slightly moist.	Complete borehole number is B3890C269.
SS	2.0	1.8	2 7 30 35				62.2 62.0 61.4				1.2 - 2.6 ft: Silty SAND, (SM); Moderate reddish brown (10R4/8), sand is fine grained, moderately sorted, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	0.9	0.7	20 50/5"				60.2 60.0				2.6 - 7.3 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grain, moderately sorted; gravel is sandstone, angular, less weathered with depth; firm, moist.	Augered to 4.0'. Spoon refusal at 4.9'. Augered to 5.0'. Spoon refusal at 5.7'.
SS	0.7	0.6	32 50/2"				59.3 59.0 58.4	5				Augered to 6.5'. Spoon refusal at 6.8'. Augered to 7.0'. Spoon refusal at 7.5'. Auger refusal at 7.8'. 3" PVC casing inserted 6.5' for gamma-logging.
SS	0.3	0.1	50/4"				57.5 57.4 57.0 56.7 56.2					PVC casing was removed after logging; hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.
SS	0.5	0.3	17 50/1"								TOTAL DEPTH = 7.8 FT.	* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Stepan Property			Last Update: 05-19-92		HOLE NO. C269	



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R270**

SITE: **Stepan Property** COORDINATES: **N 9600.0; E 10125.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-10-90** COMPLETED: **12-10-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **14.1** ROCK (FT.): **1.2** TOTAL DEPTH: **15.3**

CORE RECOVERY (FT./%): **11.0/72*** CORE BOXES: **0** SAMPLES: **11** EL. TOP CASING: **NA** GROUND EL.: **60.0** DEPTH/EL. GROUND WATER: **NA / NA** DEPTH/EL. TOP OF ROCK: **14.1/45.9**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							60.0			(Template: MYWD)	
							59.5			0.0 - 0.5 ft: CONCRETE.	
SS	1.5	0.7	20 23 9				58.8			0.5 - 5.5 ft: FILL; Gravelly Clay, Dusky yellowish brown (10YR2/2), fine to very coarse grained; changing to Sand, Dark yellowish brown (10YR4/2), medium grained, well sorted, subrounded grains at 2.3'; and changing to cinders, coal, slag and gravel mixture, Grayish black (N2) below 2.7'.	Complete borehole number is B3890R270.
SS	2.0	1.2	11 10 7				58.0				Cored concrete to 0.5'.
SS	1.0	0.8	7 50/6"				56.8			5.5 - 7.7 ft: Silty CLAY, (CL); Dark yellowish brown (10YR4/2), very fine to fine grains, medium plasticity, wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	30 1 2 1				56.0				Spoon refusal at 5.0'. Augered to 5.0'. Spoon refusal at 10.0'.
SS	2.0	1.5	9 23 26 37				55.2 55.0 54.5	5		7.7 - 14.1 ft: Silty SAND, (SM); Dusky yellowish brown (10YR2/2); medium grained, coarser grains below 10.0'; well sorted, sand -90%, silt -10%, no plasticity, moist.	Augered to 10.0'. Spoon refusal at 10.5'.
SS	1.0	1.0	26 50/6"				53.5 53.0				Augered to 10.5'. Spoon refusal at 12.5'.
SS	0.5	0.5	25 37 46 50				51.5 51.0	10		14.1 - 14.3 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), silt -70%, sand -20%, clay -10%, no plasticity, moist.	Augered to 12.5'. Spoon refusal at 13.5'. Augered to 13.5'. Spoon refusal at 15.0'. Augered to 15.0'. Spoon refusal at 15.3'.
SS	2.0	2.0	27 50/6"				45.9 45.7				3" PVC casing inserted to 15.0' for gamma-logging.
SS	1.5	0.8	5 12 50/6"				44.7	15		TOTAL DEPTH = 15.3 FT.	PVC casing was removed after logging and hole was backfilled with drilling spoils.
SS	0.3	0.0	50/4"								* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO. **R270**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R271

SITE

Stepan Property

COORDINATES

N 9324.0; E 10390.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-10-90

COMPLETED

12-10-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

5.3

ROCK (FT.)

0.0

TOTAL DEPTH

5.3

CORE RECOVERY (FT./%)

3.0/57*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

56.0

DEPTH/EL. GROUND WATER

none ATD

NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOBS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.4	14 36 30 30				56.0			0.0 - 4.5 ft: FILL; mixed gravel, slag, red brick and cement fragments.	Complete borehole number is B3890R271. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.9	20 15 11 8			54.6 54.0					
SS	1.3	0.7	7 20 50/4"			53.1 52.0 51.5 51.3 50.7	5		4.5 - 4.7 ft: Silty CLAY, (CL); Black (N1), with organics and wood fragments.		
										TOTAL DEPTH = 5.3 FT.	Spoon refusal at 5.3'. Augered to total depth of 5.3'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

Stepan Property

Last Update: 03-19-92

HOLE NO. R271



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R272**

SITE: **Stepan Property** COORDINATES: **N 9911.0; E 10410.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-11-90** COMPLETED: **12-11-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **0.6** ROCK (FT.): **5.7** TOTAL DEPTH: **6.3**

CORE RECOVERY (FT./%): **4.4/70*** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **68.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **0.6/67.4**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS ON G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	0.7	4 7 8 6				68.0 67.4 67.3				0.0 - 0.6 ft: Sandy SILT, (ML); Grayish brown (5YR3/2), silt -70%, sand -30%, no plasticity, moist.	Complete borehole number is B3890R272. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 4.8'. Augered to 5.0'. Spoon refusal at 6.2'. - Recovery in last spoon was > recorded interval driven; i.e. sample to 6.3'. Augered to 6.0'. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
SS	1.5	1.2	12 20 36				66.0				0.6 - 6.3 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), moist; changing to weathered sandstone, fine grained iron-oxide cement, blocky, below 5.0'.	
SS	1.3	1.2	30 46 50/4"				64.8 64.5					
SS	1.2	1.3	9 34 50/-2"				63.3 63.0	5				
							61.7				TOTAL DEPTH = 6.3 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R272**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R273

SITE

Stepan Property

COORDINATES

N 9450.0; E 10650.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-11-90

COMPLETED

12-11-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

2.6

ROCK (FT.)

0.0

TOTAL DEPTH

2.6

CORE RECOVERY (FT./%)

1.7/65*

CORE BOXES

SAMPLES

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

/ NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
								58.0					
SS	1.5	1.1	6					57.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R273. Augered through asphalt to 0.5' Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon and auger refusal at 2.5'; recovery > recorded interval driven, i.e. sample to 2.6'. 3" PVC casing inserted to 2.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
			23					56.4				0.5 - 2.6 ft: FILL; Sandy Silt; Moderate reddish brown (10R4/6) changing to Grayish brown (5YR3/2) at 1.4', silt -70%, sand -20%, clay and brick fragments -10%, moist.	
SS	0.4	0.6	50/-5"					56.0					
								55.4				TOTAL DEPTH = 2.6 FT.	

(Template: MYWD)

DESCRIPTION AND CLASSIFICATION

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

Complete borehole number is B3890R273.

Augered through asphalt to 0.5'

Borehole sampled and gamma-logged by TMA/Eberline Corp.

Spoon and auger refusal at 2.5'; recovery > recorded interval driven, i.e. sample to 2.6'.

3" PVC casing inserted to 2.5' for gamma-logging.

PVC casing was removed after logging and hole was backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NO = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

Stepan Property

Last Update: 03-19-92

HOLE NO. R273



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R274

SITE

Stepan Property

COORDINATES

N 9440.0; E 10650.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN

12-11-90

COMPLETED

12-11-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.8

ROCK (FT.)

3.2

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

6.0/75*

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

4.8/53.2

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH
none

LOGGED BY:

Robert Cook

(Template: MYWD)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							58.0					
							57.8					
SS	1.0	0.9	30 38				57.0				0.0 - 1.0 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R274. Augered through asphalt to 1.0'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to total depth of 8.0'. 3" PVC casing inserted to 8.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.6	30 28 34 50				56.1 56.0				1.0 - 4.3 ft: FILL; Sandy Silt; Grayish brown (5YR3/2), fine grains to pebbles up to 1 cm, silt -60%, sand -20%, gravel and brick fragments -20%, no plasticity, moist.	
SS	2.0	1.8	16 18 20 22				54.4 54.0 53.7 53.2				4.3 - 4.8 ft: SAND (SP); Moderate yellowish brown (10YR5/4), fine grained, well sorted, rounded to subrounded grains, moist.	
SS	2.0	1.7	18 20 23 32				52.2 52.0				4.8 - 7.7 ft: Sandy SILT (ML); Dark reddish brown (10R3/4), fine grained, silt -70%, sand -20%, clay -10%, no plasticity, moist; weathered sandstone, fine grained, blocky, micaceous, iron-oxide cement, below 6.7'.	
							50.3 50.0				TOTAL DEPTH = 8.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R274



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		ANGLE FROM HORIZ		BEARING					
Stepan Property				N 9,195.0; E 10,066.0		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
12-11-90	12-11-90	Hydro Group, Inc.	Soil Sentry		8"	9.1	2.9	12.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
7.6/63*		0	6	NA	54.0	NA / NA		9.1/44.9					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	3	7				54.0				(Template: MYWD)	
			10					52.6				0.0 - 7.5 ft: FILL.	Complete borehole number is B3890R275.
			12					52.0				0.0 - 1.2 ft: Silty Sand; Blackish red (5R2/2), fine to medium grained, poorly sorted, minor gravel, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.9	3	7				51.1				1.2 - 1.4 ft: Sand, Grayish black (N2), medium grains, with minor gravel, firm, moist.	
			8					50.0				2.0 - 4.1 ft: Silty Clay; Black (N1) to Grayish black (N2), moderately plastic, with wood and organic material; Slag, medium gravel size, hard, between 2.4 - 2.6'.	
			4					48.9	5			4.1 - 6.5 ft: Silty Sand; Moderate brown (5YR3/4), fine to medium grained, with minor slag, Black (N1), firm, moist.	Hole not augered; spoon hammered through slough from 4 - 6' to sample 6 - 8'.
SS	2.0	1.1	3	8				48.0				6.5 - 7.5 ft: Sand; Dark yellowish brown (10YR4/3), fine grained, moderately sorted, mixed with slag between 6.5 - 6.8', firm, moist.	Augered with stinger to 8.0'.
			11					46.5				8.0 - 9.1 ft: Clayey SAND to SAND, (SC-SP), Olive gray (5Y3/2), with minor sand clasts, changing to Sand, Black (N1), medium grained, well sorted; firm, moist to wet.	Augered with stinger to 10.0'.
			12					46.0				9.1 - 11.4 ft: Gravelly, Silty SAND; Dark reddish brown (10R3/4) mottled with Black (N1) and Blackish red (5R2/2), sand is fine to medium grained, moderately sorted, firm, changing to fractured sandstone below 10.9'.	Augered to total depth of 12.0'.
SS	2.0	1.5	18	22				44.9					3" PVC casing inserted to 11.5' for gamma-logging.
			23					44.7					
			23					44.0	10				
SS	2.0	1.3	8	12				42.6					
			18					42.0					
			24										
			12										
			12										
			22										
			28										
TOTAL DEPTH = 12.0 FT.											PVC casing was removed after logging; hole was grouted to -4' below surface and remaining hole backfilled with drilling spoils.		
											Borehole coordinates changed from original field log based on later visual inspection and/or CAD Drawings.		
											* Core recovery refers to total rock & soil sample.		
											Ground elevation estimated from site topographic map.		
											Description & classification by visual examination of sample.		
											Colors from "Rock-Color Chart" (GSA, 1948).		
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Last Update:		HOLE NO.					
				Stepan Property		10-05-92		R275					



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R276

SITE

Stepan Property

COORDINATES

N 9500.0; E 10700.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

12-11-90

COMPLETED

12-11-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

3.5

ROCK (FT.)

4.5

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

5.9/74*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

3.5/55.5

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
							59.0				(Template: MYWD)	
							58.8				0.0 - 1.0 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R276. Augered through asphalt to 1.0'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.0	0.8	12 18				58.0				1.0 - 1.4 ft: Clayey SILT, (ML); Moderate brown (5YR3/4), silt -60%, clay -30%, gravel -10%, trace sand, moist.	
SS	2.0	1.7	10 20 20 13				57.6 57.2 57.0				1.4 - 3.5 ft: Silty SAND, (SM); Light brown (5YR5/6) changing to Moderate reddish brown (10R4/6) at 2.0', fine grained, sand -70%, silt -30%, no plasticity, moist.	
SS	2.0	1.7	10 13 18 19				55.5 55.3 55.0				3.5 - 7.7 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), silt -70%, sand -20%, clay -10%, trace cobbles, no plasticity, moist; changing to sandstone, fine to medium grained, weathered, blocky, brittle, iron-oxide cement, below 6.6'.	
SS	2.0	1.7	12 13 13 18				53.3 53.0					
							51.3 51.0					
TOTAL DEPTH = 8.0 FT.											Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: Stepan Property

Last Update: 03-19-92

HOLE NO. R276



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R277

SITE

Stepan Property

COORDINATES

N 9498.0; E 10798.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-11-90

COMPLETED

12-11-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

10.9

ROCK (FT.)

0.6

TOTAL DEPTH

11.5

CORE RECOVERY (FT./%)

8.1/70*

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

59.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

10.9/48.1

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	LOSS	G.P.M.	WATER PRESS. P.S.I.	TEMP. °S	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
										59.0					
										58.8				0.0 - 1.0 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R277.
SS	1.0	0.6	9	10						58.0				1.0 - 1.6 ft: FILL; Gravel and silt, Moderate brown (5YR3/4), moist; changing to cinder, slag and coal, Grayish black (N2) at 1.3'.	Augered through asphalt to 1.0'.
SS	2.0	1.5	8	10						57.4				2.0 - 5.0 ft: Sandy SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Dark yellowish brown (10YR4/2) at 2.4' and to Moderate yellowish brown (10YR5/4) at 2.9'; fine grained, silt -80%, sand -20%, changing at 2.9' to silt -60%, sand -20%, clay -10%; no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	8	16						55.5					
			18	20						55.0					
			18	20						54.0	5			5.0 - 6.4 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), sandstone, fine to medium grained, subangular to subrounded, weathered, blocky, iron-oxide cement, moist.	
SS	2.0	1.4	6	8						53.3				6.4 - 8.5 ft: SAND, (SP); Moderate brown (5YR4/4), fine to medium grained, well sorted, subrounded grains, moist.	
			8	16						53.0					
			16	18						52.6					
			18							51.6					
SS	2.0	1.8	7	8						51.0				8.5 - 8.9 ft: Clayey SILT, (ML); Light brown (5YR5/6), very fine grained, stratified, -1/4" layers, moist.	
			8	16						50.5				8.9 - 10.9 ft: SAND, (SP); Moderate brown (5YR4/4); fine to medium grains, well sorted between 8.9 - 10.4', medium to very coarse grains below; subangular to surrounded grains, no plasticity, moist.	Spoon refusal at 11.1'.
			22							50.1					
SS	1.1	1.1	6-8	50/2"						49.2	10				
			50/2"							49.0					
SS	0.4	0.0	50/5"							48.1				10.9 - 11.1 ft: SANDSTONE; Dark reddish brown (10R3/4), weathered, blocky, brittle.	Spoon and auger refusal at 11.5'.
										47.9					
										47.5					

TOTAL DEPTH = 11.5 FT.

3" PVC casing inserted to 11.5' for gamma-logging.

PVC casing was removed after logging and hole was backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R277



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R278

SITE

Stepan Property

COORDINATES

N 9203.0; E 10024.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

12-12-90

COMPLETED

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

8.4

ROCK (FT.)

1.8

TOTAL DEPTH

10.2

CORE RECOVERY (FT./%)

6.8/67*

CORE BOXES

SAMPLES

6

SEL. TOP CASING

NA

GROUND EL.

54.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

8.4/45.6

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.3	4 9 12 8		54.0				0.0 - 1.3 ft: FILL; Sandy Silt, Moderate brown (5YR3/4) changing to Dusky yellowish brown (10YR2/2) at 0.5', silt -70%, sand -30%, fine to medium grained, trace wood, gravel and cinders, moist.	Complete borehole number is B3890R278.
SS	2.0	1.6	10 4 7 5		52.7 52.0				2.0 - 3.0 ft: SILT, (ML); Bluish white (5B9/1), silt -85%, clay -15%, very fine grained, no plasticity, moist (Sludge?).	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.2	7 3 4 6		51.0 50.4 50.0				3.0 - 6.7 ft: Clayey SILT, (ML); Black (N1) changing to Olive gray (5Y4/1) at 4.0' and to Brownish gray (5YR4/1) at 4.8', very fine grained, silt -80% decreasing with depth to -60%, clay -20% increasing with depth to -40%, solvent odor, medium plasticity, moist; layer of Silty Sand, Olive gray (5Y4/1), sand -70%, silt -30%, between 3.0 - 3.3.	
SS	2.0	1.7	15 17 22 29		48.8 48.0	5			6.7 - 7.0 ft: SAND, (SW); Light olive gray (5Y6/1), fine to very coarse grains.	
SS	0.9	0.8	29 50/5"		47.0 46.5 46.3 46.0 45.8 45.2				7.0 - 7.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4) interbedded with Grayish black (N2), moist.	
									7.5 - 8.4 ft: SAND, (SW); Light olive gray (5Y6/1), fine to medium grains, sand -85%, silt -15%.	Spoon refusal at 9.0'.
SS	0.2	0.2	50/2"		44.0 43.8	10			8.4 - 10.2 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, sand -60%, silt -40%, weathered sandstone.	Augered to 10.0'. Spoon refusal at 10.2'.
									TOTAL DEPTH = 10.2 FT.	3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.

(Template: MYWD)

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R278



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R279

SITE

Stepan Property

COORDINATES

N 9,172.0; E 10,068.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-12-90

COMPLETED

12-12-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

9.6

ROCK (FT.)

1.9

TOTAL DEPTH

11.5

CORE RECOVERY (FT./%)

8.7/76*

CORE BOXES

SAMPLES

0

EL. TOP CASING

NA

GROUND EL.

55.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

9.6/45.4

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYWD)

DESCRIPTION AND CLASSIFICATION

NOTES ON:
WATER LEVELS,
WATER RETURN,
CHARACTER OF
DRILLING, ETC.

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS	% CORE RECOVERY	LOSS	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE
						G.P.M.	PRESS. P.S.I.	TIME MIN.				
SS	2.0	1.1	3	4	5				55.0			
			10						53.9			
SS	2.0	1.6	5	4	4				53.0			
			5						52.2			
SS	2.0	1.7	2	4	7				51.4			
			8						51.0			
									50.4	5		
SS	2.0	1.6	13	18	21				49.3			
			36						49.0			
									48.2			
SS	1.0	1.0	18	50/6"					47.4			
									47.0			
SS	2.0	1.2	17	10	11				45.4			
			39						44.8	10		
SS	0.5	0.5	50/6"						44.0			
									43.5			

0.0 - 1.1 ft: FILL; Sandy Silt; Moderate brown (5YR3/4); with gravel, cinders, coal and slag, Grayish black (N2) below 1.0'; moist.

2.0 - 2.8 ft: SILT, (ML); Bluish white (5B9/1), very fine grained, silt -80%, clay -20%, no plasticity, moist (Sludge?).

2.8 - 4.6 ft: Silty SAND, (SM); Grayish black (N2); fine to medium, subrounded grains, sand -80%, silt -20%, solvent odor, no plasticity, moist.

4.6 - 6.8 ft: Sandy SILT, (ML); Grayish black (N2), Olive gray (5Y4/1) interbedded layers 1/4" at 5.5'; fine to medium grained, silt -70%, sand -30%, low plasticity, moist.

6.8 - 9.6 ft: Silty SAND, (SM); Black (N1), sand -70%, silt -30%, no plasticity, moist to wet at 9.0'.

9.6 - 11.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, silt -60%, sand -40%, no plasticity; changing to Sandstone, fine grained, weathered, blocky, brittle, iron-oxide cement, at 11.0'.

Complete borehole number is B3890R279.

Borehole sampled and gamma-logged by TMA/Eberline Corp.

Spoon refusal at 9.0'. Augered to 9.0'.

Augered to 11.0'. Spoon refusal at 11.5'.

3" PVC casing inserted to 10.5' for gamma-logging.

PVC casing was removed after logging and hole was backfilled with drilling spoils.

TOTAL DEPTH = 11.5 FT.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; HQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R279



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R280

SITE

Stepan Property

COORDINATES

N 9640.0; E 10100.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-12-90

COMPLETED

12-12-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

11.1

ROCK (FT.)

2.9

TOTAL DEPTH

14.0

CORE RECOVERY (FT./%)

7.2/51*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

11.1/46.9

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						LOSS	P.S.I.	TIME IN MIN.						
									58.0				(Template: NYWD)	
									57.0				0.0 - 1.0 ft: CONCRETE.	Complete borehole number is B3890R280.
SS	1.0	1.0	21	18					55.0				1.0 - 6.5 ft: FILL, Gravel, cinders, slag and brick fragments; Grayish black (N2) changing to Light gray (N6) at 4.0', fine to very coarse grains, angular to subrounded grains below 4.0'.	Cored through concrete to 1.0'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	12	10					54.0					
			8	8					53.4					
SS	2.0	0.6	3	2					52.0					
			2	2					51.5					
			2	2					50.0					
SS	2.0	0.7	3	2					49.2				6.5 - 6.7 ft: Silty CLAY, (CL); Moderate brown (5YR4/4), very fine grained, clay -70%, silt -30%, high plasticity, wet.	
			2	2					48.6				8.0 - 8.8 ft: Gravelly SILT, (GM); Moderate brown (5YR4/4), very fine grains to pebbles up to 1 cm, wet.	
SS	2.0	1.4	9	11					48.0				8.8 - 11.1 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), very fine to fine grains, well sorted, sand -70%, silt -30%, pebbles up to 1 cm at 11.0', no plasticity, moist to wet at 10.0'.	
			10	10					46.9					
			17	17					46.7					
SS	2.0	1.3	18	14					46.0				11.1 - 13.2 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, low plasticity, wet; changing to Sandstone, fine grained, weathered, blocky, brittle, iron-oxide cement at 12.0'.	Spoon refusal at 13.9'. Augered to total depth of 14.0'. 3" PVC casing inserted to 13.0' for gamma-logging.
			13	13					44.8					
			21	21					44.0					
SS	1.9	1.2	7	16										
			27	27										
			50/5"	50/5"										
TOTAL DEPTH = 14.0 FT.													PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
													* Core recovery refers to total soil & rock sample. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R280



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R281

SITE

Stepan Property

COORDINATES

N 9,248.0; E 10,044.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-12-90

COMPLETED

12-12-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

11.1

ROCK (FT.)

1.9

TOTAL DEPTH

13.0

CORE RECOVERY (FT./%)

10.7/82*

CORE BOXES

0

SAMPLES

7

EL. TOP CASING

NA

GROUND EL.

54.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

11.1/42.9

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.8	5 10 12 5				54.0				0.0 - 4.3 ft: FILL; Gravelly to Sandy Silt; Moderate brown (5YR3/4) changing to Grayish black (N2) at 2.4' and to Moderate reddish brown (10R4/6) at 2.9', fine grains to cobble size, with brick fragments between 2.9 - 4.3', no plasticity, moist; layer of cinders, coal and gravel, Grayish black (N2), fine to very coarse grains, no plasticity, moist, between 1.0 - 1.8'.	Complete borehole number is B3890R281.	
SS	2.0	1.4	5 8 9 5				52.2 52.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.8	4 2 2 3				50.6 50.0 49.7			4.3 - 6.2 ft: Silty CLAY (CL); Moderate yellowish brown (10YR5/4), very fine to fine grained, clay -60%, silt -30%, sand -10%, medium plasticity, wet.			
SS	2.0	1.6	18 23 41 39				48.2 48.0 47.8			6.2 - 7.4 ft: SAND, (SP); Black (N1); fine to medium, subangular to subrounded grains; well sorted, solvent odor, no plasticity, moist.			
SS	2.0	1.8	12 14 17 31				46.6 46.4 46.0			7.4 - 8.6 ft: Sandy SILT, (ML); Moderate brown (5YR3/4), fine to coarse grains, silt -70%, sand -20%, clay -10%, low plasticity, moist.			
SS	2.0	1.7	7 10 17 19				45.4 44.2 44.0		10	8.6 - 11.1 ft: SAND, (SP); Grayish black (N2); fine to medium, subangular to subrounded grains; well sorted, no plasticity, moist.			
SS	1.0	0.6	21 50/6"				42.9 42.3 42.0 41.4 41.0			11.1 - 12.6 ft: SANDSTONE; Dark reddish brown (10R3/4), mottled below 12.0'; fine to medium grained, weathered, blocky, brittle, iron-oxide cement.	Spoon refusal at 13.0'. Augered to total depth of 13.0'.		
TOTAL DEPTH = 13.0 FT.													3" PVC casing inserted to 12.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.

(Template: MYWD)

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
10-05-92

HOLE NO.

R281



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R282

SITE

Stepan Property

COORDINATES

N 9,241.0; E 10,111.0

ANGLE FROM HORIZ. BEARING

Vertical

BEGUN

12-13-90

COMPLETED

12-13-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL
Mobile B-80

SIZE
8"

OVERBURDEN
7.0

ROCK (FT.)
3.0

TOTAL DEPTH
10.0

CORE RECOVERY (FT./%)

7.2/72*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.3	7 8 12				55.0				0.0 - 2.9 ft: FILL; Sandy Silt; Moderate brown (5YR3/4), silt -70%, sand -30%, grass, no plasticity; changing to cinders and slag; Grayish black (N2), fine to very coarse grains, below 2.0'; moist.	Complete borehole number is B3890R282. Borehole sampled and gamma-logged by TMA/Eberline Corp. nr = not recorded.
SS	2.0	1.4	1 8 10				53.7 53.0				2.9 - 4.4 ft: SILT to Sandy SILT, (ML); Very pale orange (10YR8/2), very fine grained; changing to Moderate brown (5YR3/4), fine to medium grained, silt -60%, sand -40%, at 3.1'; no plasticity, moist.	
SS	2.0	1.6	3 4 7 12				49.5 49.4 49.0 48.4 48.0	5			4.4 - 5.5 ft: Silty CLAY, (CL); Grayish brown (5YR3/2), very fine to fine grained, medium plasticity, moist.	
SS	2.0	1.6	14 19 15 21				47.4 47.0				5.5 - 6.6 ft: Silty SAND, (SM); Grayish black (N2), fine to medium grained, solvent odor, moist.	
SS	2.0	1.3	8 16 24 21				45.7 45.0				6.6 - 7.0 ft: Sandy SILT, (ML); Moderate brown (5YR3/4), fine to medium grained, silt -60%, sand -40%, no plasticity, moist.	
								10			7.0 - 9.3 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, weathered, blocky, iron-oxide cement, moist.	
TOTAL DEPTH = 10.0 FT.											Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

(Template: MYWD)

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
10-05-92

HOLE NO.
R282



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R283

SITE

Stepan Property

COORDINATES

N 9278.0; E 10035.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-13-90

COMPLETED

12-13-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

11.1

ROCK (FT.)

3.3

TOTAL DEPTH

14.4

CORE RECOVERY (FT./%)

11.1/77*

CORE BOXES

0

SAMPLES

8

EL. TOP CASING

NA

GROUND EL.

54.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

11.1/42.9

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.7	9 12 15 15				54.0				0.0 - 2.7 ft: FILL; Sandy silt; Moderate brown (5YR3/4), silt -70%, sand -20%, gravel and brick fragments -10%, roots, no plasticity, moist; changing to cinders, gravel and slag; Grayish black (N2), fine to very coarse grains at 0.8'.	Complete borehole number is B3890R283.
SS	2.0	1.3	8 13 5 3				52.3 52.0 51.3 50.7				2.7 - 5.8 ft: Clayey SILT, (ML); Olive black (5Y2/1) changing to Grayish black (N2) with mottling at 4.0', very fine to fine grained, silt -60%, clay -40%, medium plasticity; changing to silt -50%, clay -50%, high plasticity at 4.0'; moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	1 1 2 8				50.0	5			5.8 - 7.6 ft: SAND, (SP); Black (N1), medium grained, well sorted, solvent odor, no plasticity; changing to Olive black (5Y2/1), fine grained, at 7.0'; moist.	
SS	2.0	1.6	8 15 16 17				48.2 46.4 46.0				8.0 - 9.2 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained; changing to Moderate brown (5YR3/4), fine to medium grained with -5% gravel at 9.0'; no plasticity, moist.	
SS	2.0	1.3	8 13 16 19				44.8 44.4 44.0	10			9.2 - 11.1 ft: SAND, (SP); Dusky yellowish brown (10YR2/2) changing to Moderate brown (10YR5/4) at 9.4'; fine, subrounded grains, well sorted; very coarse grains with trace fines between 10.0 - 10.6'; no plasticity, moist.	Spoon refusal at 12.9'.
SS	0.9	0.3	26 50/4"				42.9 42.7 42.0 41.7				11.1 - 14.3 ft: SANDSTONE; Dark reddish brown (10R3/4), weathered, blocky, brittle, iron-oxide cement.	Augered to 13.0'. Spoon refusal at 14.4'.
SS	1.4	1.3	18 21 50/5"				41.0 39.7 39.6					Augered to 14.0'. 3" PVC casing inserted to 13.5' for gamma-logging.
TOTAL DEPTH = 14.4 FT.											PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update: 03-19-92
HOLE NO. R283



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R284

SITE

Stepan Property

COORDINATES

N 9242.0; E 10293.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN

12-13-90

COMPLETED
12-13-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

12.6

ROCK (FT.)

3.4

TOTAL DEPTH

16.0

CORE RECOVERY (FT./%)

8.7/54*

CORE BOXES

0

SAMPLES

8

EL. TOP CASING

NA

GROUND EL.

54.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

12.6/41.4

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	0.9	6 8 10				54.0			0.0 - 2.7 ft: FILL; Sandy Silt; Dark reddish brown (10R3/4), fine grained, roots; with gravel and brick fragments below 2.0', no plasticity.	Complete borehole number is B3890R284. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.7	10 18 20 24				53.1				
SS	2.0	1.7	10 13 14 16				52.0				
SS	2.0	0.9	11 9 18 12				51.3				
SS	2.0	0.8	16 8 6 9				50.0		4.0 - 6.6 ft: Sandy SILT to SILT, (ML); Moderate brown (5YR3/4) changing to Dark reddish brown (10R3/4) at 4.8', fine to coarse grained, fine to medium grained below 4.8'; changing to Silt, Very pale orange (10YR8/2), very fine grain, no plasticity, at 5.1'; moist.		
SS	2.0	0.9	11 17 25 30				48.9	5			
SS	2.0	1.4	11 17 20 23				48.3				
SS	1.9	1.4	15 20 33 60/5*				48.0				
							47.4			6.6 - 10.4 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Moderate yellowish green (5GY7/4) at 8.0', fine grained, silt -80%, clay -20%, no plasticity; changing to clay -40%, medium plasticity, mottled, with 1/8" layers at 8.0'; moist.	
							47.1				
							46.0			10.4 - 10.9 ft: SAND, (SP); Dark yellowish brown (10YR4/2), fine to medium grains, well sorted, no plasticity, moist.	
							45.2				
							44.0	10			
							43.6			12.0 - 12.6 ft: Clayey SILT, (ML); Olive black (5Y2/1), fine grained, silt -60%, clay -40%, medium plasticity, solvent odor, moist.	
							43.1				
							42.0			12.6 - 15.4 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, iron-oxide cement, mottled, weathered, brittle, blocky, moist.	
							41.4				
							40.6				
							40.0				
							38.6	15			
							38.0				
TOTAL DEPTH = 16.0 FT.										Spoon refusal at 15.9'. Augered to total depth of 16.0'. 3" PVC casing inserted to 16.0' for gamma-logging.	
										PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
										* Core recovery refers to total rock & soil sample.	
										Ground elevation estimated from site topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R284



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R285					
Stepan Property				N 9474.0; E 10289.0		Vertical							
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
12-13-90	12-13-90	Hydro Group, Inc.		Mobile B-80	8"	8.0	0.0	8.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
5.7/71*		0	4	NA	57.0	NA / NA		NA / NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>								
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					LOSS IN G.P.M.	TIME MIN.							
SS	2.0	1.8	15 17 14 19				57.0				(Template: MYWD)		
SS	2.0	1.3	14 7 8 6				55.4 55.0				0.0 - 4.9 ft: FILL; Gravel, cinders and trace coal; Grayish black (N2) changing to Dusky yellowish brown (10YR2/2) at 2.0', moist.	Complete borehole number is B3890R285.	
SS	2.0	1.2	4 4 2 5				53.7 53.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.6	2 5 10 26				52.1 51.8 51.0	5			4.9 - 7.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -70%, sand -30%, no plasticity, moist; some sandstone cobbles, fine grained, weathered, brittle, blocky, iron-oxide cement, below 6.0'.		
							49.4 49.0				TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing, inserted to 7.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
* Core recovery refers to total rock & soil sample.													
Ground elevation estimated from site topographic map.													
Description & classification by visual examination of sample.													
Colors from "Rock-Color Chart" (GSA, 1948).													
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				Stepan Property		Last Update: 03-19-92		HOLE NO. R285	



GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R286
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9640.0; E 10605.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-14-90	12-14-90	Hydro Group, Inc.	Mobile B-80		8"	0.5	3.5	4.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
3.0/75*		0	2	NA	63.0	NA / NA		0.5/62.5			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								63.0					
SS	1.5	1.0	25				62.8					0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R286.
			31				61.5					0.5 - 4.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -70%, sand -30%, no plasticity; changing to Sandstone, fine grained, weathered, blocky, brittle, iron-oxide cement, below 2.0'; moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	0.5	0.5	50/8"				61.0						
SS	1.5	1.5	42										
			21										
			20										
							59.0					TOTAL DEPTH = 4.0 FT.	Spoon refusal at 2.5'. Augered to 2.5'. Augered to total depth of 4.0'. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: Stepan Property
 HX = HAND AUGER; O = OTHER
 Last Update: 03-19-92 HOLE NO. R286



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R287				
Stepan Property				N 9550.0; E 10560.0		ANGLE FROM HORIZ BEARING						
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
12-15-90	12-15-90	Hydro Group, Inc.		Mobile B-80	8"	0.7	5.3	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.9/65*		0	3	NA	61.0	/ NA		0.7/80.3				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	TIME MIN.						
SS	2.0	1.2	23 17 16 13				61.0					
SS	2.0	1.5	11 26 27 17				60.3 59.8 59.0				0.0 - 0.7 ft: FILL; Cinders, gravel and coal; Dusky yellowish brown (10YR2/2). dry. 0.7 - 5.3 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained; with weathered sandstone, brittle, blocky, iron-oxide cement, moist.	Complete borehole number is B3890R287. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.9	1.2	25 19 21 50/6"				57.5 57.0 55.8	5				Spoon refusal at 5.9'. Augered to total depth of 6.0'. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 6.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE **Stepan Property** Last Update: 03-19-92 HOLE NO. **R287**



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R288
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Stepan Property			N 9490.0; E 10340.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
12-15-90	12-15-90	Hydro Group, Inc.		Mobile B-80	3"	3.5	0.0	3.5		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
2.2/63*		0	2	NA	57.0	NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.6	23 30 14 12				57.0					
SS	1.5	0.7	12 18 14				55.5 55.0 54.3 53.5				0.0 - 2.7 ft: FILL; Gravel, cinders and slag; Dusky yellowish brown (10YR2/2), fine to coarse grains, no plasticity, moist.	Complete borehole number is B3890R288. Borehole sampled by TMA/Eberline Corp. Hole sampled to 3.5' without augering; Spoon refusal at 3.5' - suspected water line. Hole was not gamma-logged.
TOTAL DEPTH = 3.5 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: Stepan Property

Last Update: 03-19-92

HOLE NO. R288



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.	
SITE			FUSRAP		14501	1 OF 1 R289	
Stepan Property			COORDINATES		ANGLE FROM HORIZ. BEARING		
			N 9485.0; E 10340.0		Vertical -----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
12-15-90	12-15-90	Hydro Group, Inc.	Mobile B-80	8"	11.1	3.9	15.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK	
9.2/61*	0	8	NA	57.0	NA	11.1/45.9	
SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:			
140 lbs/30 in	none			Robert Cook <i>[Signature]</i>			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.3	21					57.0				0.0 - 6.5 ft: FILL.	Complete borehole number is B3890R289. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 9.7'. Augered to 10.0'. Spoon refusal at 10.5'. Augered to 10.5'. Sampled to 14.5'. Augered to total depth of 15.0'. 3" PVC casing inserted to 15.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			25					55.7				0.0 - 1.0 ft: Gravel, cinders, coal and slag; Dusky yellowish brown (10YR2/2), fine grains to pebble size up to 1 cm, no plasticity, moist.	
SS	2.0	1.4	6					55.0				1.0 - 1.3 ft: Sludge; White (N9) with Light brown (5YR5/6) stains, silty, no plasticity, moist.	
			4					53.6				2.0 - 2.9 ft: Cinders and slag; Grayish black (N2) to Medium light gray (N6), fine to very coarse grain, no plasticity, moist.	
SS	2.0	1.1	9					53.0				2.9 - 6.5 ft: Sandy Silt; Dark reddish brown (10R3/4), with cinders and slag -10% increasing to -90% below 4.0', no plasticity, moist.	
			3					51.9	5				
			2					51.0					
SS	2.0	1.3	2					50.5					
			3					50.1					
			5					49.7				6.5 - 6.9 ft: Clayey SILT, (ML); Dark yellowish brown (10YR4/2), silt -70%, sand -30%, low plasticity, moist.	
			16					49.0				6.9 - 7.3 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), sandstone, fine grained, weathered, blocky, brittle, iron-oxide cement, moist.	
SS	1.7	1.3	17					47.9				8.0 - 9.1 ft: SAND, (SP); Dark yellowish brown (10YR4/2); fine to medium, subangular to subrounded grains; changing to Dusky yellowish brown (10YR2/2), medium to very coarse grains at 8.7'; no plasticity, moist.	
			26					47.7					
			64					47.0	10				
			50/2"					46.5					
SS	0.5	0.5	50/6"					45.9					
SS	2.0	1.0	10					45.5				9.1 - 10.5 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), sandstone, blocky, brittle, iron-oxide cement, moist.	
			21					44.5				10.5 - 11.1 ft: SAND, (SP); Dark yellowish brown (10YR4/2), moist.	
			26					43.2				11.1 - 13.8 ft: SANDSTONE; Dark reddish brown (10R3/4), moist.	
			32					42.0	15			TOTAL DEPTH = 15.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R289
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	C290
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Stepan Property			N 10005.0; E 10650.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
12-17-90	12-17-90	Hydro Group, Inc.	Mobile B-80		8"	2.0	1.0	3.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
2.2/73*		0	2	NA	69.0	/ NA		2.0/67.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						P.S.I.	TIME MIN.						
								69.0				(Template: MYMD)	
SS	1.5	1.2	26					68.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890C290. Borehole sampled by TMA/Eberline Corp. Spoon refusal at 2.9'. - Recovery in last spoon was > recorded interval driven; i.e. sample to 3.0'. Augered to total depth of 3.0'. Borehole was backfilled with drilling spoils.
			18					67.3				0.5 - 1.7 ft: Sandy SILT, (ML); Light brown (5YR5/6), fine to medium grained, trace gravel, no plasticity, dry.	
SS	0.9	1.0	27					67.0				2.0 - 3.0 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), fine to medium grained, no plasticity.	
			50/-5*					66.0				TOTAL DEPTH = 3.0 FT.	

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. C290
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R291			
Stepan Property				N 9300.0; E 10440.0		Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-17-90	12-17-90	Hydro Group, Inc.	Mobile B-80		8"	14.3	3.7	18.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
9.8/54*		0	9	NA	56.0	7 / NA 8 / NA		14.3/41.7			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.2	8 5				56.0				
SS	2.0	1.2	5 5 4 4				54.8 54.0 52.8			0.0 - 8.5 ft: FILL; Cinders, slag and coal; Grayish black (N2), fine to very coarse grains, no plasticity, moist to wet at 4.0'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	0.7	4 3 2 5				52.0 51.3	5		OVA - 60 ppm in sewer line -10' from hole; 0 ppm in ambient air.	
SS	2.0	0.5	4 4 4 5				50.0 49.5				
SS	2.0	1.2	13 3 16 36				48.0 47.5				
SS	2.0	1.3	8 18 20 15				46.8 46.0	10		8.5 - 12.3 ft: SAND, (SM); Brownish gray (5YR4/1) changing to Olive black (5Y2/1) at 10.0', very fine to fine grains, minor silt, no plasticity, moist.	
SS	2.0	1.3	4 11 18 31				44.7 44.0 43.7			12.3 - 14.3 ft Sandy SILT, (ML); mottled fine to medium grained, silt -60%, sand -30%, clay -10%, low plasticity, moist.	
SS	2.0	1.6	15 13 31 27				42.7 42.0 41.7			Augered to total depth of 18.0'. 3" PVC casing inserted to 17.0' for gamma-logging.	
SS	2.0	0.8	18 40 30 29				40.4 40.0 39.2	15		14.3 - 16.8 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, weathered, blocky, brittle, iron-oxide cement, moist.	
							38.0			PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	
									TOTAL DEPTH = 18.0 FT.	* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; SITE				Stepan Property				Last Update: 03-19-92		HOLE NO. R291	
HX = HAND AUGER; O = OTHER											



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R292

SITE

Stepan Property

COORDINATES

N 9352.0; E 10300.0

ANGLE FROM HORIZON

Vertical

BEARING

BEGUN

12-17-90

COMPLETED

12-17-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

6.0

ROCK (FT.)

3.0

TOTAL DEPTH

9.0

CORE RECOVERY (FT./%)

6.1/68*

CORE BOXES

0

SAMPLES

5

EL. TOP CASING

NA

GROUND EL.

55.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

6.0/49.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	28 36 44 41				55.0						(Template: MYWD) Complete borehole number is B3890R292. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 7.2'. Augered to 8.0'. Spoon refusal at 8.4'. Augered to total depth of 9.0'. 3" PVC casing inserted to 8.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.6	18 15 11 10				53.6 53.0 52.5				0.0 - 2.5 ft: FILL; mixture of Sandy Silt, Moderate reddish brown (10R4/6) and cinders and coal, Grayish black (N2); cinders -50% and sandy silt -50%, some coal, no plasticity, moist.		
SS	2.0	1.5	7 11 14 21				51.4 51.0				2.5 - 4.8 ft: Clayey Sandy SILT, (ML); Dark yellowish brown (10YR4/2), very fine to fine grained, silt -60%, sand -20%, clay -10%, low plasticity, moist.		
SS	1.2	1.2	23 18 50/3"				50.2 49.9 49.5 49.0	5			4.8 - 5.1 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), sandstone, weathered, blocky, brittle.		
SS	0.4	0.4	50/5"				47.8 47.0 46.6 46.0				5.1 - 5.5 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2), very fine to fine grained, silt -70%, sand -20%, clay -10%, no plasticity, moist. 6.0 - 8.4 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, weathered, blocky, brittle, iron-oxide cement, micaceous, wet.		
TOTAL DEPTH = 9.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

Stepan Property

Last Update: 03-19-92

HOLE NO. R292



GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R293**

SITE **Stepan Property** COORDINATES **N 9334.0; E 10397.0** ANGLE FROM HORIZ **Vertical** BEARING **-----**
 BEGUN **12-17-90** COMPLETED **12-17-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Soil Sentry** SIZE **8"** OVERBURDEN **4.2** ROCK (FT.) **0.0** TOTAL DEPTH **4.2**
 CORE RECOVERY (FT./%) **2.4/57*** CORE BOXES **0** SAMPLES **3** EL. TOP CASING **NA** GROUND EL. **56.0** DEPTH/EL. GROUND WATER **NA** DEPTH/EL. TOP OF ROCK **NA/NA**
 SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Stephen Knuttel**

SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	40 30 14 10				56.0					0.0 - 4.1 ft: FILL.	Complete borehole number is B3890R293. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 3.8'. Augered to 4.0'. Spoon refusal at 4.2'. Auger refusal at 4.2'. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
							54.6					0.0 - 1.4 ft: Sandy Gravel; Olive gray (5Y3/2 - 5Y4/1), medium size gravel, loose, slightly moist.	
SS	1.8	0.9	9 9 9	50/3"			54.0					2.0 - 2.3 ft: Sludge; clayey silt.	
							53.1					2.3 - 4.1 ft: Slag; Black (N1), with coal(?), coarse sand to fine gravel size, loose, slightly moist.	
SS	0.2	0.1	50/3"				52.0					TOTAL DEPTH = 4.2 FT.	
							51.9						
							51.8						

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **R293**



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R294

SITE

Stepan Property

COORDINATES

N 9739.0; E 10330.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-17-90

COMPLETED

12-17-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

3.2

ROCK (FT.)

2.8

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

4.6/77*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

60.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

3.2/56.8

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.4	4	34				60.0					
			4	34				59.6				0.0 - 0.4 ft: FILL; Gravel and cinders; Medium dark gray (N4), fine to medium grains, no plasticity.	Complete borehole number is BS890R294. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	17	19				58.6				0.4 - 1.4 ft: Silty CLAY (CL); Moderate yellowish brown (10YR5/4), very fine to fine grained, clay -70%, silt -30%, medium plasticity, moist.	
			20	30				58.0				2.0 - 3.2 ft: Silty SAND, (SM); Moderate brown (5YR4/4), fine to medium grained, sand -70%, silt -30%, no plasticity, moist.	
SS	2.0	1.6	30	30				56.8				3.2 - 5.6 ft: SANDSTONE; Dark reddish brown (10R3/4), weathered, blocky, brittle, iron-oxide cement, micaceous.	
			30	30				56.4					
			50	50				56.0					
								54.4					
								54.0					
TOTAL DEPTH = 6.0 FT.												Augered to total depth of 6.0'. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R294



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R295

SITE

Stepan Property

COORDINATES

N 10003.0; E 10337.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

1-2-91

COMPLETED

1-2-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

2.8

ROCK (FT.)

3.7

TOTAL DEPTH

6.5

CORE RECOVERY (FT./%)

4.4/68*

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

67.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

2.8/64.2

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS ON G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.2	5 5 16 11				67.0			<p>0.0 - 2.8 ft: FILL; Silty Sand; Dark reddish brown (10R3/4) changing to Grayish brown (5YR3/2), mottled, at 2.0'; fine to medium grained; sand -60%, silt -30%, with gravel and glass, low plasticity, moist.</p> <p>2.8 - 6.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, no plasticity, moist; changing to Sandstone, iron-oxide cement, weathered, brittle, blocky, at 3.2'.</p>	<p>Complete borehole number is B3890R295.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Spoon refusal at 5.9'. Augered to 6.0'. Spoon refusal at 6.4'. Augered to total depth of 6.5'. 3" PVC casing inserted to 6.0' for gamma-logging.</p> <p>PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.</p>
SS	2.0	1.7	6 8 10 23				65.8				
							65.0				
							64.2				
SS	1.9	1.1	23 20 22 50/4"				63.3 63.0				
							61.9	5			
SS	0.4	0.4	50/5"				61.0 60.6 60.5				
TOTAL DEPTH = 6.5 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

R295



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

C296

SITE

Stepan Property

COORDINATES

N 10003.0; E 10745.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

1-3-91

COMPLETED

1-3-91

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

3.0

ROCK (FT.)

7.0

TOTAL DEPTH

10.0

CORE RECOVERY (FT./%)

7.7/77*

CORE BOXES

0

SAMPLES

7

EL. TOP CASING

NA

GROUND EL.

68.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

3.0/65.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYWD)

DESCRIPTION AND CLASSIFICATION

NOTES ON:
WATER LEVELS,
WATER RETURN,
CHARACTER OF
DRILLING, ETC.

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE
						PRESS. P.S.F.	TIME MIN.				
SS	1.5	1.5	23					68.0			
			9					67.8			
			14					67.5			
SS	0.9	0.9	41					65.1			
			50/4"					65.0			
SS	0.5	0.5	50/6"								
SS	0.5	0.5	42								
SS	2.0	2.0	26						5		
			21								
			16								
			29								
SS	2.0	2.0	19								
			17								
			22								
			36								
SS	2.0	0.3	29					59.7			
			23								
			27								
			50								

0.0 - 0.5 ft: ASPHALT; over sand and gravel.
0.5 - 2.9 ft: Sandy SILT, (ML); Moderate brown (5YR4/4) changing to Dark reddish brown (10R3/4) at 2.0', fine to medium grained, trace roots; no plasticity, moist.
3.0 - 8.3 ft: SANDSTONE; Dark reddish brown (10R3/4), very fine to fine grained, weathered, blocky, brittle, iron-oxide cementation, micaceous; weathered sandstone and sandy silt below 4.0', fine to very coarse grained, well sorted, subangular to subrounded grains, sandstone cobbles -10%, moist.

TOTAL DEPTH = 10.0 FT.

Complete borehole number is B3890C296.
Augered through asphalt to 0.5'.
Borehole sampled and gamma-logged by TMA/Eberline Corp.
Spoon refusal at 2.9'.
Augered to 3.0'.
Spoon refusal at 3.5'.
Augered to 3.5'.
Sampled and augered to 4.0'.
Augered to total depth of 10.0'.
3" PVC casing inserted to 9.5' for gamma-logging.
PVC casing was removed after logging and hole was backfilled drilling spoils.
* Core recovery refers to total rock & soil sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. C296



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

C297

SITE

Stepan Property

COORDINATES

N 9998.0; E 10550.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

1-3-91

COMPLETED

1-3-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

13.0

ROCK (FT.)

0.0

TOTAL DEPTH

13.0

CORE RECOVERY (FT./%)

9.3/72*

CORE BOXES

SAMPLES

SEL. TOP CASING

GROUND EL.

75.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	1.0	0.9	23 6				75.0 74.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890C297. Borehole sampled and gamma-logged by TMA/Eberline Corp. Pungent odor at 11.5', but OVA levels low enough to continue; drilled through a barrel. Spoon refusal at 13.0'. Augered to total depth of 13.0' 3" PVC casing inserted to 12.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.9	11 12 20 33				73.6 73.0				0.5 - 12.6 ft: FILL. 0.5 - 5.1 ft: Sandy Silt, Dark reddish brown, mottled; (10R3/4), fine to medium grained, silt -70%, sand -30%, no plasticity, moist; mixed with layers of Sludge up to 1" thick, Medium gray (N5), Black (N1) and White (N9) below 2.9'.	
SS	2.0	2.0	5 4 4 5				71.1 71.0	5			5.1 - 12.6 ft: Sludge; conglomerated and swirled mass, Medium gray (N5), Black (N1) and White (N9) changing to mixture of Gray (N5) and White (N9) below 6.8'; pudding-like texture, fine grained, no plasticity, moist; layer of sandy silt, Moderate brown (5YR3/4), fine to medium grained, no plasticity, moist between 6.0 - 6.8'.	
SS	2.0	2.0	3 2 3 6									
SS	2.0	1.3	3 2 7 9									
SS	2.0	0.6	6 7 11 24				65.6 65.0 64.4	10				
SS	1.0	0.6	1-9 50/0"				63.0 62.4 62.0					
TOTAL DEPTH = 13.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO.

C297



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **C298**

SITE: **Stepan Property** COORDINATES: **N 9957.0; E 10550.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **1-3-91** COMPLETED: **1-4-91** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"/3"** OVERBURDEN: **10.7** ROCK (FT.): **5.3** TOTAL DEPTH: **16.0**

CORE RECOVERY (FT./%): **9.4/59*** CORE BOXES: **0** SAMPLES: **7** EL. TOP CASING: **NA** GROUND EL.: **75.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **10.7/64.3**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	0.7	0.7	30 50/2"				75.0				(Template: MYWD)	
							74.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890C298.
							73.8				0.5 - 10.7 ft: FILL.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	11 11 10 12				73.0				0.5 - 4.8 ft: Sandy Silt, Dark reddish brown (10R3/4), Light brown (5YR5/6) between 2.0 - 3.8'; fine to medium grained, silt -70%, sand -30%, sandstone cobbles <20% below 3.0', no plasticity, moist.	
							71.3				4.8 - 10.7 ft: Sludge, conglomerated and swirled mass of White (N9), Medium gray (N5) and Black (N1), with some Light brown (5YR5/6) below 8.0'; very fine to fine grains, clayey to silty; thinly laminated, -1/4 - 1/2 inch beds below 8.0'; no plasticity, moist.	
SS	2.0	2.0	9 3 2 4				71.0	5				
							68.1					Spoon refusal at 12.2'.
SS	2.0	1.7	1 2 1 1				67.0					Augered to refusal at 13.6'
							65.3					Core barrel sampled from 13.6 - 16.0' on 4 Jan., 91 (- recovery >1.1' minimum material necessary for sampling).
SS	2.0	1.1	1/12" 22 14				65.0	10				
							64.3					
							63.9					
							63.0					
SS	0.2	0.2	50/2"				62.8				10.7 - 16.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, with sandstone below 14.0'.	3" PVC casing inserted for gamma-logging; logging completed in open 3" borehole below 13.6'.
							61.4					
NQ	2.4	-1.1	na				60.3	15				PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
							59.0					
TOTAL DEPTH = 16.0 FT.												
											* Core recovery refers to total rock & soil sample.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination of sample.	
											Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO. **C298**



GEOLOGIC DRILL LOG										PROJECT			JOB NO.	SHEET NO.	HOLE NO.
SITE										COORDINATES			14501	1 OF 1	C299
Stepan Property										N 9435.0; E 10300.0			Vertical	-----	
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
1-4-91		1-4-91		Hydro Group, Inc.		Soil Sentry		8"	6.0	4.0	10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING		GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
5.9/59*		0	5	NA		56.0	/ none ATD / NA		6.0/50.0						
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:									
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>									
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLKS	% CORE RECOVERY	LOSS ON DRY	WATER PRESS. G.P.M.	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	1.4	30	29	15	12			56.0				0.0 - 4.4 ft: FILL.	Complete borehole number is B3890C299.	
SS	2.0	1.7	4	4	3	2			54.6	54.0			0.0 - 0.9 ft: Silty Gravel, Olive gray (5Y3/2) changing to Dark reddish brown (10R3/4) at 0.3', fine to coarse gravel, poorly sorted.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	0.4	2	3	3	6			52.3	52.0	51.6	5	0.9 - 4.4 ft: Slag and Gravelly Silt, Grayish black (N2) mixed with White (N9), salt and pepper appearance; changing to Black (N1) at 4.0', red brick fragment between 4.3 - 4.4'; loose, slightly moist.	Augered to 4.0'.	
SS	2.0	1.0	7	10	15	30			50.0	49.0			6.0 - 9.4 ft: Gravelly, Silty SAND (SM); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 6.5', sand is fine to medium grained, moderately sorted, gravel is sandstone, moderately firm, moist to wet.	Augered to 6.0'.	
SS	2.0	1.4	7	21	26	40			48.0	46.6	46.0	10	TOTAL DEPTH = 10.0 FT.	Augered to 8.0'.	
													Augered to total depth of 10.0'.	3" PVC casing inserted to total depth for gamma-logging.	
													PVC casing was removed after logging; hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.		
													* Core recovery refers to total rock & soil sample.		
													Ground elevation estimated from site topographic map.		
													Description & classification by visual examination of sample.		
													Colors from "Rock-Color Chart" (GSA, 1948).		

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Stepan Property

Last Update: 03-19-92
HOLE NO. C299



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R700			
Stepan Property				N 10012.0; E 10348.0		ANGLE FROM HORIZ		BEARING			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
1-2-91	1-2-91	Hydro Group, Inc.	Tripod		3.5"	0.0	4.8	4.8			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
3.5/73*		0	3	NA	67.0	/ NA		0.0/67.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLMS. % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.5	4 7 8 12				67.0		0.0 - 4.2 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 1.0', sand is fine to medium, moderately sorted, abundant roots and organic material between 0.0 - 0.5', unweathered sandstone gravel below 3.6', firm, moist.	Complete borehole number is B3890R700. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.8	18 20 40 47			65.5 65.0					
SS	0.8	0.2	40 50/3"			63.2 63.0 62.8 62.2					
TOTAL DEPTH = 4.8 FT.											Spoon refusal at 4.8'. 3" PVC casing inserted to 4.5' for gamma-logging. PVC casing was removed after logging; hole was grouted to -2' below surface and remaining hole backfilled with drilling spoils.
* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property		Last Update: 03-19-92		HOLE NO. R700	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	C701				
Stepan Property				N 9420.0; E 10300.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
1-4-91	1-4-91	Hydro Group, Inc.	Soil Sentry		8"	10.0	0.1	10.1				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.1/70%		0	6	NA	56.0	-5' ATD		10.0/46.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOCKS	CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.							TIME IN MIN.
SS	2.0	1.6	15 16 11 11				56.0				0.0 - 3.6 ft: FILL; Silty, Sandy Gravel mixed with Slag and Coal; Moderate reddish brown (10R4/6) with Olive gray (5Y3/2) and Black (N2), fine to coarse grained, poorly sorted; Slag content increases below 2.0', salt & pepper appearance, Grayish black (N2) mixed with White (N9); moist; Layer of Silty Sand, Moderate brown (5YR4/4) between 2.5 - 2.8'.	Complete borehole number is B3890C701. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	3 3 5 7				54.4 54.0				4.0 - 7.8 ft: Silty SAND, (ML); Grayish brown (5YR3/2) changing to Blackish red (5R2/4) at 6.0', fine to medium sand, moderately sorted, gravel content increases below 6.0', moderately firm, moist.	4 - 6' spoon was apparently full but sample slid out because no core catcher was used. Augered to 6.0'.
SS	2.0	0.4	6 5 10 10				52.4 52.0 51.6				8.0 - 9.6 ft: SAND, (SP); Grayish black (N2), medium grain, moderately sorted, trace fines, moderately firm, wet.	Augered to 8.0'.
SS	2.0	1.8	7 10 15 15				50.0				10.0 - 10.1 ft: Silty, Sandy GRAVEL, (GM); Dark reddish brown (10R3/4), gravel is sandstone.	Augered to 10.0'. Spoon refusal at 10.1'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
SS	2.0	1.6	12 12 24 47				48.2 48.0				TOTAL DEPTH = 10.1 FT.	
SS	0.1	0.1	50/2"				46.4 46.0 45.9					

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
C701



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R702**

SITE: **Stepan Property** COORDINATES: **N 9710.0; E 10035.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **1-7-91** COMPLETED: **1-7-91** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **10.0** ROCK (FT.): **4.0** TOTAL DEPTH: **14.0**

CORE RECOVERY (FT./%): **8.8/63*** CORE BOXES: **0** SAMPLES: **7** EL. TOP CASING: **NA** GROUND EL.: **57.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **10.0/47.0**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.7	31 46 34 50/5"				57.0			0.0 - 6.5 ft: FILL; Sandy Silt; Olive gray (5Y4/1) changing to a mixture of Black (N2), Olive black (5Y2/1), Dusky yellowish brown (10YR2/2) and Dark reddish brown (10YR3/4) below 0.7', fine to medium grains, some gravel up to 2 cm, coal and brick fragments, content increasing below 0.7'; coal -20%, gravel <10%, no plasticity, moist to wet below 4.0'.	Complete borehole number is B3890R702.
SS	2.0	1.6	26 35 45 50/6"				55.3 55.0				Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.2	24 4 3 1				53.4 53.0 52.8				
SS	2.0	1.4	5 3 14 35				51.0 50.5 50.1 49.6	5		6.5 - 6.9 ft: Silty SAND, (SM); Moderate brown (5YR3/4), fine to medium grained, sand -60%, silt -30%, clay -10%, low plasticity, moist.	
SS	2.0	1.4	15 29 34 36				48.1 47.9 47.6 47.0			6.9 - 7.4 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained; some sandstone fragments, weathered, blocky, brittle; wet.	
SS	2.0	1.4	17 12 15 16				45.6 45.0	10		8.0 - 8.9 ft: Silty SAND, (SM); Grayish brown (5YR3/2), very fine to fine grained, well sorted, sand -80%, silt -20%, no plasticity, moist.	
SS	2.0	1.1	5 20 22 27				43.9 43.0			8.9 - 9.1 ft: CLAY, (CL); Moderate brown (5YR3/4), very fine grained, no plasticity, hard, moist.	
										9.1 - 9.4 ft: SAND, (SW); Brownish gray (5YR4/1), medium to coarse grains, well graded, trace fines, no plasticity, wet.	Augered to total depth of 14.0'.
										10.0 - 13.1 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 11.1', fine to medium grained, well sorted, no plasticity, moist.	3" PVC casing inserted to 14.0' for gamma-logging.
TOTAL DEPTH = 14.0 FT.											PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R702**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R703
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Stepan Property			N 9245.0; E 10303.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-7-91	1-7-91	Hydro Group, Inc.	Soil Sentry		8"	10.0	2.0	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
7.2/60*		0	6	NA	54.0	NA / NA		10.0/44.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
SS	2.0	1.4	10 18 15 10				54.0			0.0 - 8.4 ft: FILL.	Complete borehole number is B3890R703. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	10 9 8 10				52.6 52.0 50.9			0.0 - 0.8 ft: Silty Sand, Moderate reddish brown (10R4/6), minor debris 0.8 - 2.6 ft: Gravel, Sand and Slag; mixture of Moderate brown (5YR4/4), Black (N1) and White (N9); with cement fragments below 2.0', loose, moist.	
SS	2.0	0.8	10 11 12 14				50.0 49.2	5		2.6 - 3.1 ft: Gravelly Sand; Moderate brown (5YR3/4), fine to medium grained, poorly sorted, loose, moist.	
SS	2.0	1.2	7 10 10 12				48.0 46.8			4.0 - 8.4 ft: Sludge; Very light gray (N8) changing to Dark gray (N5) at 6.3' and to Dark yellowish green (10GY4/4) at 8.3', silty to clayey, chalky, minor debris, soft, becoming hard at 8.3', moist.	
SS	2.0	1.8	10 10 12 17				46.0 45.6			8.4 - 9.8 ft: Silty SAND interlayered with Clayey SILT, (SM - ML); Moderate brown (5Y2/1) interlayered with Olive black (5Y2/1) clayey silt; sand is fine grained, moderately sorted; silt is moderately plastic, firm; moist; layer of fine Sand, Black (N1), between 9.4 - 9.8', clean, moderately firm, moist.	
SS	2.0	0.9	18 30 40 47				44.2 44.0 43.1	10		10.0 - 10.9 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), fine grained, moderately sorted, firm, moist.	
							42.0			TOTAL DEPTH = 12.0 FT.	Augered to 8.0'. Augered to 10.0'. Augered to total depth of 12.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging; hole was grouted to -7' below surface and remaining hole backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R703
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R704

SITE

Stepan Property

COORDINATES

N 9690.0; E 10035.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

COMPLETED

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

8.0

ROCK (FT.)

4.0

TOTAL DEPTH

12.0

CORE RECOVERY (FT./%)

9.1/76*

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

8.0/49.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	1.3	1.1	27 43 50/4"				57.0						(Template: MYWD) Complete borehole number is B3890R704. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 1.3'. Augered to 2.0'. Spoon refusal at 9.1'. Augered to 10.0'. Augered to total depth of 12.0'. 3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.8	43 17 13 28				55.9				0.0 - 4.4 ft: FILL; Gravelly Silt, Olive gray (5Y4/1) changing to Grayish black (N2) at 1.1', fine grained to pebbles up to 2 cm, silt -70-80%, gravel -20-30%; with coal and slag, fine to coarse grained below 1.1; no plasticity, moist.		
SS	2.0	1.7	15 6 5 4				53.2 53.0 52.6				4.4 - 5.1 ft: Silty CLAY, (CL); Grayish brown (5YR3/2), fine grained, clay -60%, silt -40%, no plasticity, hard, moist.		
SS	2.0	1.8	5 5 6 12				51.9 51.3 51.0	5			5.1 - 7.8 ft: Clayey SILT, (ML); Moderate brown (5YR3/4) changing to Dusky yellowish brown (10YR2/2) at 6.0', mottled and to Moderate reddish brown (10R4/6) at 6.5'; very fine to fine grained, silt -60-70%, clay -20-30%, up to 20% sand with depth, low plasticity, moist.		
SS	1.1	1.1	10 40 50/2"				49.2 49.0				8.0 - 11.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), very fine to fine grained, silt -60%, sand -30%, clay -10%, low plasticity, moist.		
SS	2.0	1.6	8 16 19 23				47.9 47.0	10					
							45.4 45.0						
TOTAL DEPTH = 12.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R704



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R705				
Stepan Property				N 9245.0; E 10273.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
1-2-91	1-2-91	Hydro Group, Inc.	Soil Sentry	8"	10.6	3.4	14.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	E.L. TOP CASING	GROUND EL.	DEPTH/E.L. GROUND WATER	DEPTH/E.L. TOP OF ROCK					
8.1/58*		0	7	NA	54.0	NA / NA	10.6/43.4					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.2	7 9 9 7				54.0			(Template: NYWD)		
SS	2.0	0.9	7 7 10 7				52.8 52.0 51.1			0.0 - 5.1 ft: FILL. 0.0 - 4.2 ft: Silty, Sandy Gravel, Very dusky red (10R2/2), with red brick fragments, firm, moist.	Complete borehole number is B3890R705. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.1	5 5 8 10				50.0 48.9	5		4.2 - 5.1 ft: Sludge; Medium gray (N5) to Black (N1), chalky, silty between 4.2 - 4.6', sandy with roots at below; firm, moist.		
SS	2.0	1.5	7 7 11 12				48.0 46.5 46.0			6.0 - 9.5 ft: Sandy SILT to Silty SAND, (ML - SM); Grayish red (5R4/2), trace mottling with Black (N1), sand content increases with depth, moderately firm, moist.		
SS	2.0	1.5	6 12 29 25				44.5 44.0 43.6 43.4 43.1	10		10.4 - 10.6 ft: Gravelly, Sandy SILT, (ML); Olive gray (5Y3/2).		
SS	2.0	0.9	9 30 46 40				42.0 41.0			10.6 - 13.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), stained in places below 12.0' with Black (N1), sand is fine to medium, gravel is sandstone, moderately sorted, firm, moist.	Spoon refusal at 13.8'. Augered to total depth of 14.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging; hole was grouted to -6' below surface and remaining hole backfilled with drilling spoils.	
							40.0			TOTAL DEPTH = 14.0 FT.	* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R705



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R706**

SITE: **Stepan Property** COORDINATES: **N 9640.0; E 10125.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **1-7-91** COMPLETED: **1-7-91** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **12.6** ROCK (FT.): **3.4** TOTAL DEPTH: **16.0**

CORE RECOVERY (FT./%): **9.4/59*** CORE BOXES: **0** SAMPLES: **7** EL. TOP CASING: **NA** GROUND EL.: **60.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **12.6/47.4**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							60.0				(Template: NYWD)	
SS	1.5	0.9	15 21 17				59.5				0.0 - 0.5 ft: CONCRETE	Complete borehole number is B3890R706. Cored through concrete to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to total depth of 16.0'. 3" PVC casing inserted to 16.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
							58.6				0.5 - 6.9 ft: FILL	
SS	2.0	1.2	13 45 43 34				58.0				0.5 - 6.2 ft: Gravel, cinders, slag and brick fragments; Very pale orange to Grayish black (N2), very fine grains to pebbles, minor coal.	
SS	2.0	1.2	16 13 8 3				56.8				6.2 - 6.7 ft: Clayey Silt, Grayish yellow (5Y8/4) changing to Pale purple (5P6/2) at 6.5', very fine grained, silt -70%, clay -30%, low plasticity.	
SS	2.0	1.7	3 2/12" 1				56.0				6.7 - 6.9 ft: Gravelly slag, Medium dark gray (N4), wet.	
SS	2.0	0.8	1 1 10 19				54.8	5			6.9 - 7.7 ft: Silty CLAY, (CL); Light bluish gray (5B7/1), very fine grained, low plasticity.	
SS	2.0	1.7	31 33 47 18				53.1				8.0 - 10.3 ft: Silty SAND, (SM); Black (N1), fine grained with gravel up to 4 cm, sand -60%, silt -30%, gravel -10%, no plasticity, wet.	
SS	2.0	1.1	10 17 11 19				52.3				10.3 - 11.0 ft: SAND, (SP); Moderate brown (5YR4/4), medium to very coarse grains, well sorted, no plasticity, moist.	
SS	2.0	0.8	5 10 14 21				52.0				11.0 - 12.6 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2), fine to medium grained, no plasticity, moist.	
							51.2				12.6 - 14.8 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6) changing to Grayish red (10R4/2) at 14.0', fine grained, silt -60%, sand -20%, clay -20%, stiff, no plasticity.	
							50.0	10				
							49.7					
							49.0					
							48.3					
							48.0					
							47.4					
							46.9					
							46.0					
							45.2	15				
							44.0					
TOTAL DEPTH = 16.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R706**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R707			
Stepan Property				N 9245.0; E 10325.0		Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
1-7-91	1-7-91	Hydro Group, Inc.	Soil Sentry		8"	8.8	3.2	12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.6/55*		0	6	NA	54.0	NA / NA		8.8/45.2			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.1	2 6 10 11				54.0			0.0 - 8.8 ft: FILL.	Complete borehole number is B3890R707.
SS	2.0	0.7	4 6 12 10				52.9			0.0 - 1.1 ft: Gravelly Sand and debris, Moderate brown (5YR3/4), cement and red brick fragments.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	7 9 9 12				52.0			2.0 - 2.7 ft: Silty Sand, Moderate brown (5YR3/4) to Moderate reddish brown (10Y4/6), with minor sandstone gravel, loose, moist.	
SS	2.0	1.5	5 8 17 8				51.3			4.0 - 6.7 ft: Silty Sand; Moderate brown (5YR3/4), fine to medium grained, moderately sorted, minor roots, moderately firm, moist.	
SS	2.0	1.0	6 9 14 14				50.0	5		6.7 - 8.8 ft: Gravelly, Silty Sand; Moderate reddish brown (10R4/6), sand is fine to medium, poorly sorted, slag fragments between 8.2 - 8.4'.	Augered to 8.0'.
SS	2.0	1.0	4 5 11 17				48.7			8.8 - 11.0 ft: Silty SAND, (SM); Dark reddish brown (10R3/4) mottled in places with Black (N2), sand is fine, poorly sorted, minor sandstone gravel.	Augered to 8.0'.
							48.0				Augered to 10.0'.
							46.5				
							46.0				
							45.2				
							45.0				
							44.0	10			
							43.0				
							42.0				
TOTAL DEPTH = 12.0 FT.										Augered to total depth of 12.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils and sand.	
										* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R707



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R708

SITE

Stepan Property

COORDINATES

N 9640.0; E 10075.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN

1-7-91

COMPLETED

1-7-91

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.6

ROCK (FT.)

5.9

TOTAL DEPTH

10.5

CORE RECOVERY (FT./%)

4.4/42*

CORE BOXES

SAMPLES

EL. TOP CASING

NA

GROUND EL.

60.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

4.6/55.4

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYWD)

DESCRIPTION AND CLASSIFICATION

NOTES ON:
WATER LEVELS,
WATER RETURN,
CHARACTER OF
DRILLING, ETC.

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.				
SS	1.5	0.5	23 8 6				60.0			
SS	2.0	0.8	20 13 8 6				59.5 59.0			
SS	2.0	1.1	4 3 3 1				58.0 57.2			
SS	2.0	0.4	1 2/12" 4				56.0 55.4 54.9	5		
SS	2.0	1.1	10 14 19 41				54.0 53.6			
SS	0.5	0.5	50/6"				52.0 50.9 50.0 49.5	10		

0.0 - 0.5 ft: CONCRETE.

0.5 - 4.6 ft: FILL; Gravel, sand and silt. Light olive gray (5Y6/1), fine grains to pebbles; slag, cinders and coal, Grayish black (N2) and Medium light gray (N6) between 2.0 - 4.6'.

4.6 - 10.5 ft: Sandy SILT, (SM); Dark reddish brown (10R3/4), mottled below 8.0', fine grained, silt -70%, sand -30%, no plasticity, wet.

TOTAL DEPTH = 10.5 FT.

Complete borehole number is B3890R708.

Cored through concrete to 0.5'.

Borehole sampled and gamma-logged by TMA/Eberline Corp.

Augered to 10.0'. Spoon refusal at 10.5'.

3" PVC casing inserted to 10.0' for gamma-logging.

PVC casing was removed after logging; hole was backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R708



GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R709**

SITE **Stepan Property** COORDINATES **N 9243.0; E 10250.0** ANGLE FROM HORIZ. BEARING **Vertical**

BEGUN **1-8-91** COMPLETED **1-8-91** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Soil Sentry** SIZE **8"** OVERBURDEN **12.7** ROCK (FT.) **1.3** TOTAL DEPTH **14.0**

CORE RECOVERY (FT./%) **7.0/50*** CORE BOXES **0** SAMPLES **7** EL. TOP CASING **NA** GROUND EL. **54.0** DEPTH/EL. GROUND WATER **7 / NA** DEPTH/EL. TOP OF ROCK **12.7/41.3**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Stephen Knuttel**

Stephen Knuttel

(Template: MYWD)

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.I.	TIME MIN.						
SS	2.0	0.9	12 12 19 20				54.0				<p>0.0 - 4.8 ft: FILL; Sandy Gravel to Silty Sand, Grayish black (N2) to Moderate brown (5YR3/4), with debris, sand is fine to medium, poorly sorted.</p> <p>6.0 - 12.7 ft: SAND, (SW); Moderate brown (5YR3/4) to Grayish brown (5YR2), fine grained with medium sand below 10.0' poorly to moderately sorted, moderately firm to firm, moist to wet; increased clay and gravel content between 8.0 - 9.3' with color change to Grayish red (5R4/2) and Olive black (5Y2/1); some Clayey Silt sedimentary clast, Grayish black (N2) between 10.0 - 10.8'; interlayered with Silty Sand, Black (N1), fine grained, moderately well sorted between 12.0 - 12.7'.</p> <p>12.7 - 12.9 ft: Silty SAND, (SM); Dark reddish brown (10R3/4) with Black (N1) staining in places, sand is fine to medium, poorly sorted, minor sandstone gravel, firm, moist.</p> <p>TOTAL DEPTH = 14.0 FT.</p>	<p>Complete borehole number is B3890R709.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Augered to 6.0'.</p> <p>Augered to 8.0'.</p> <p>Augered to 10.0'.</p> <p>Augered to 12.0'.</p> <p>Spoon refusal at 13.8'.</p> <p>Augered to total depth of 14.0'.</p> <p>3" PVC casing inserted to total depth for gamma-logging.</p> <p>PVC casing was removed after logging; hole was backfilled with drilling spoils.</p> <p>* Core recovery refers to total rock & soil sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>
SS	2.0	1.0	4 5 12 10				53.1					
SS	2.0	0.8	12 20 10 6				52.0					
SS	2.0	1.5	2 2 2 4				51.0					
SS	2.0	1.3	7 9 12 20				50.0					
SS	2.0	0.6	8 12 16 20				49.2	5				
SS	2.0	0.9	11 14 30 50/4"				48.0					
							46.5					
							46.0					
							44.7					
							44.0	10				
							43.4					
							42.0					
							41.3					
							41.1					
							40.0					

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; 0 = OTHER

SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **R709**



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R710

SITE

Stepan Property

COORDINATES

N 9736.0; E 10035.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

1-8-91

COMPLETED

1-8-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

12.0

ROCK (FT.)

0.3

TOTAL DEPTH

12.5

CORE RECOVERY (FT./%)

8.2/66*

CORE BOXES

0

SAMPLES

7

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

12.0/45.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	70 55 39 43				57.0				0.0 - 3.0 ft: FILL. 0.0 - 1.3 ft: Sandy SILT; Moderate reddish brown (10R4/6) changing to Moderate brown (5YR3/4) at 0.9', fine grains to trace pebbles. 1.3 - 3.0 ft: Gravel, cinders and coal; Grayish black (N2), fine grains to pebbles.	Complete borehole number is B3890R710. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	49 37 34 27				55.5 55.0 54.0					
SS	2.0	0.7	13 6 2 4				53.0 52.3	5			4.0 - 4.7 ft: Clayey SILT (ML); Grayish brown (5YR3/2) changing to White (N9) and Grayish black (N2) at 4.4', fine to medium grained, no plasticity, moist.	
SS	2.0	1.1	3 2 2 3				51.0 50.5 49.9				6.0 - 6.5 ft: Sandy SILT (ML); Moderate brown (5YR3/4), fine to coarse grained, no plasticity. 6.5 - 8.4 ft: Silty CLAY (CL); Olive gray (5Y3/2), very fine to fine grained, medium plasticity, moist.	
SS	2.0	1.7	9 25 24 26				49.0 48.6				8.4 - 9.4 ft: Silty SAND (SM); Olive black (5Y2/1), fine to medium grained, well sorted, subrounded to subangular grains, no plasticity, moist.	
SS	2.0	1.9	4 9 21 37				47.6 47.3 47.0	10			9.4 - 9.7 ft: CLAY (CL); Grayish orange (10YR7/4), very fine grained, low plasticity, moist. 10.0 - 11.9 ft: SAND (SP); Dusky yellowish brown (10YR2/2) changing color to Dark yellowish brown (10YR4/2) at 10.9', fine to medium grained, well sorted, no plasticity, moist.	
SS	0.5	0.3	50/4"				45.1 45.0 44.7 44.5				12.0 - 12.3 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, weathered, blocky, iron-oxide cement.	Augered to 12.0'. Spoon refusal at 12.3'. 3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.

TOTAL DEPTH = 12.5 FT.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R710



GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R711**

SITE **Stepan Property** COORDINATES **N 9650.0; E 9800.0** ANGLE FROM HORIZ. BEARING **Vertical**

BEGUN **1-8-91** COMPLETED **1-8-91** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Mobile B-80** SIZE **8"** OVERBURDEN **7.1** ROCK (FT.) **2.9** TOTAL DEPTH **10.0**

CORE RECOVERY (FT./%) **6.5/65*** CORE BOXES **0** SAMPLES **5** EL. TOP CASING **NA** GROUND EL. **57.0** DEPTH/EL. GROUND WATER **NA** DEPTH/EL. TOP OF ROCK **7.1/49.9**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.						
SS	2.0	1.5	12 10 8 14			57.0				0.0 - 4.5 ft: FILL ; Sandy Silt; Moderate brown (5YR3/4) changing to Dark reddish brown (10R3/4) at 0.6'; Dark yellowish brown (10YR4/2) mixed with White (N9), Dark yellowish orange (10YR6/6), Medium gray (N5) and Grayish black (N2) below 2.0'; with cinders and slag below 1.1'.	Complete borehole number is B3890R711.
SS	2.0	1.3	16 14 21 21			55.5 55.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.7	8 6 7 9			53.7 53.0 52.5 52.3	5			4.5 - 7.1 ft: Silty SAND, (SM) ; Brownish gray (5YR4/1) changing to Black (N1) at 6.0'; very fine to fine grained, well sorted, sand -70%, silt -30%, no plasticity, moist to wet at 6.0'.	
SS	2.0	1.8	5 9 9 10			51.0 49.9				7.1 - 9.3 ft: SANDSTONE and Sandy SILT ; Dark reddish brown (10YR3/4), mottled; brittle, weathered, blocky, fine grained, sandy silt content increasing with depth, no plasticity.	
SS	2.0	1.2	9 8 11 17			49.2 49.0 47.8 47.0					
TOTAL DEPTH = 10.0 FT.										Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE **Stepan Property** Last Update: **03-19-92** HOLE NO. **R711**



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R712

SITE

Stepan Property

COORDINATES

N 9352.0; E 10290.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

1-8-91

COMPLETED

1-8-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

6.5

ROCK (FT.)

1.5

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

6.8/85%

CORE BOXES

SAMPLES

EL. TOP CASING

NA

GROUND EL.

53.0

DEPTH/EL. GROUND WATER

NA

DEPTH/EL. TOP OF ROCK

6.5/46.5

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.7	49 41 29 22				53.0				0.0 - 4.4 ft: FILL. 0.0 - 1.0 ft: Gravel, Moderate brown (5YR3/4), with sand and silt, gravel to pebble size, no plasticity, moist. 1.0 - 2.7 ft: Sandy Silt interbedded with coal and cinders, Black (N1) and Dark reddish brown (10R3/4), layers -2" thick. 2.7 - 3.3 ft: Sandy Silt, Dark yellowish brown (10YR4/2), silt -70%, sand -20%, clay -10%, no plasticity. 3.3 - 4.4 ft: Coal and cinders, Black (N1).	Complete borehole number is B3890R712.
SS	2.0	1.8	19 12 10 9				51.3 51.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	9 13 27 46				49.2 49.0 48.6					
SS	2.0	1.5	44 41 32 27				47.2 47.0 46.5				4.4 - 6.5 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2), very fine grained with trace coarse material below 5.8', well sorted, sand -70%, silt -20%, clay -10%, moist.	
							45.5 45.0				6.5 - 7.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, no plasticity, moist.	
TOTAL DEPTH = 8.0 FT.											Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.	

(Template: MYMD)

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R712



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R713**

SITE: **Stepan Property** COORDINATES: **N 9352.0; E 10310.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **1-8-91** COMPLETED: **1-8-91** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **8.5** ROCK (FT.): **2.0** TOTAL DEPTH: **10.5**

CORE RECOVERY (FT./%) **7.9/75*** CORE BOXES: **0** SAMPLES: **6** EL. TOP CASING: **NA** GROUND EL.: **53.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **8.5/44.5**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE	SAMP. BLOMS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.8	41 36 34 40				53.0			0.0 - 2.2 ft: FILL; Gravel, sand, silt, and glass, with cinders and coal below 0.6', Grayish black (N2), fine sand to pebble sized fragments, no plasticity.	Complete borehole number is B3890R713.
SS	2.0	1.7	21 15 9 6				51.2 51.0 50.8			2.2 - 7.0 ft. Sandy SILT, (ML); Dark reddish brown (10R3/4), Dark yellowish brown (10YR4/2) between 3.0 - 5.0; silt with -20% fine to medium-grained sand, 20% clay, low plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.5	1.0	4 10 50/6"				49.3 49.0	5			Spoon refusal at 5.5'. Augered to 6.0'.
SS	2.0	1.6	25 23 17 23				48.0 47.0 46.0				
SS	0.5	0.3	50/6"				45.4 45.0 44.7 44.5			7.0 - 8.3 ft: Clayey SILT, (ML); Olive gray (5Y4/1), mottled with Dark reddish brown (10R3/4); some granite pebbles, Very pale orange (10YR8/2) present.	Spoon refusal at 8.5'. Augered to 8.5'.
SS	2.0	1.5	50 27 24 19				43.0 42.5	10		8.5 - 10.0 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, micaceous, weathered, blocky to fissile.	
TOTAL DEPTH = 10.5 FT.										Augered to total depth of 10.5'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R713**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R714**

SITE **Stepan Property** COORDINATES **N 9435.0; E 10245.0** ANGLE FROM HORIZ BEARING **Vertical**

BEGUN **1-8-91** COMPLETED **1-8-91** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Mobile B-80** SIZE **8"** OVERBURDEN **2.6** ROCK (FT.) **1.9** TOTAL DEPTH **4.5**

CORE RECOVERY (FT./%) **3.9/87*** CORE BOXES **0** SAMPLES **3** EL. TOP CASING **NA** GROUND EL. **56.0** DEPTH/EL. GROUND WATER **7 / none ATD** DEPTH/EL. TOP OF ROCK **2.6/53.4**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.7	13 21 22 14				56.0						(Template: NYWD) Complete borehole number is B3890R714. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 3.9'. Augered to 4.0'. Spoon refusal at 4.5'. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
							55.1				0.0 - 0.9 ft: Silty, Sandy GRAVEL, (GM); Olive gray (5Y4/1).		
SS	1.9	1.8	19 27 29 50/5"				54.3 54.0 53.4				0.9 - 2.6 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), fine to coarse grained, with some very coarse material.		
SS	0.5	0.4	50/6"				52.2 52.0 51.6 51.5				2.6 - 4.4 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, weathered, blocky to fissile, brittle, iron-oxide cement.		
TOTAL DEPTH = 4.5 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

Stepan Property Last Update: 03-19-92 HOLE NO. R714



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R715				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
Stepan Property			N 9435.0; E 10325.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
1-9-91	1-10-91	Hydro Group, Inc.		Mobile B-80		8"	13.8	1.2	15.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
9.6/64*		0	8	NA	56.0	V / none ATD / NA		13.8/2.2				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME IN MIN.						
SS	0.7	0.6	48 50/2"				56.0				(Template: MYWD)	
							55.4				0.0 - 4.8 ft: FILL; Gravel, Sand and Silt, Moderate brown (5YR3/4); Cinders, Slag and Coal at 2.0', Grayish black (N2) to Grayish brown (5YR3/2).	Complete borehole number is B3890R715.
SS	2.0	0.5	3 2 2 2				54.0 53.5					Borehole sampled and gamma-logged by TMA/Eberline Corp.
							52.0					Spoon refusal at 0.7'. Augered to 2.0'. Augered to 4.0'.
SS	2.0	1.5	1 1 1 2				51.2	5			4.8 - 8.3 ft: Clayey SILT, (ML); Grayish black (N2) changing to Olive gray (5Y4/1) at 6.0', silt -60%, clay -30%, sand -10%.	Augered to 6.0'.
SS	2.0	1.7	2 2 4 12				60.5 50.0					Augered to 8.0'. Augered to 10.0'.
SS	2.0	1.9	20 24 28 31				48.3 48.0 47.7 47.4				8.3 - 8.5 ft: Silty CLAY, (CL); Moderate brown (5YR4/4), fine grained, clay -60%, silt -40%, low plasticity, stiff, moist.	Augered to 12.0'.
SS	2.0	1.1	14 14 24 34				46.1 46.0	10			8.5 - 13.8 ft: Silty SAND, (SM); Pale brown (5YR5/2) changing to Brownish black (5YR2/1) at 12.0', very fine to medium grained; medium to very coarse grained layer between 12.2 - 13.1'; sand -80%, silt -20%, no plasticity, moist.	Spoon refusal at 13.4'. Augered to 13.5'. Spoon refusal at 15.0'.
SS	1.4	1.2	12 28 50/5"				44.0					Augered to total depth of 15.0'. 3" PVC casing inserted to 15.0' for gamma-logging.
SS	1.5	1.1	29 18 50/6"				42.8 42.5 42.2				13.8 - 14.6 ft: SANDSTONE and Sandy SILT, (ML); Dark reddish brown (10R3/4), weathered, blocky, micaceous, iron cement, moist.	PVC casing was removed after logging and hole was backfilled with drilling spoils.
							41.4 41.0	15				TOTAL DEPTH = 15.0 FT.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R715



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R716

SITE

Stepan Property

COORDINATES

N 9493.0; E 10390.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

1-10-91

COMPLETED

1-10-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

7.2

ROCK (FT.)

1.8

TOTAL DEPTH

9.0

CORE RECOVERY (FT./%)

6.3/70*

CORE BOXES

0

SAMPLES

5

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

↓ / none ATD
↓ / NA

DEPTH/EL. TOP OF ROCK

7.2/49.8

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLKS. / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	1.0	0.9	36 50/6"				57.0				0.0 - 4.5 ft: FILL; Gravel, Sand and Silt; Olive gray (5Y4/1), moist; Slag and Coal at 0.5', Grayish black (N2), with brick fragments, fine to very coarse grained.	Complete borehole number is B3890R716.
SS	2.0	1.7	19 12 10 9				56.1					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	5 3 3 3				55.0					Spoon refusal at 1.0'. Augered to 2.0'. Augered to 4.0'.
SS	2.0	1.8	4 9 15 26				53.3 53.0 52.5 52.0		5		4.5 - 5.0 ft: Silty CLAY, (CL); Olive black (5Y2/1) mottled with Grayish black (N2), very fine grained, clay -60%, silt -40%, medium plasticity, moist.	Augered to 6.0'.
SS	0.9	0.9	36 50/5"				51.0 49.8 49.2 49.0				6.0 - 7.2 ft: Clayey SILT, (ML); Grayish black (N2), very fine to fine grained, silt -60%, clay -20%, sand -20%, low plasticity, moist.	Augered to 8.0'.
							48.1 48.0				7.2 - 8.9 ft: SANDSTONE and Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, no plasticity, weathered, blocky, brittle, moist.	Spoon refusal at 8.9'. Augered to total depth of 9.0'. 3" PVC casing inserted to 9.0' for gamma-logging.
TOTAL DEPTH = 9.0 FT.											PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.	

(Template: MYWD)

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; 0 = OTHER

Stepan Property

Last Update: 03-19-92

HOLE NO. R716



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES			14501	1 OF 1	R717			
Stepan Property				N 9400.0; E 10400.0			ANGLE FROM HORIZ		BEARING			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL			SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
1-10-91	1-10-91	Hydro Group, Inc.	Mobile B-80			8"	10.1	2.9	13.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
8.7/67*		0	7	NA	56.0	/ none ATD / NA		10.1/46.1				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook							
SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLK. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.1	19 9 10 7				56.0				(Template: MYWD)	
							54.9				0.0 - 4.3 ft: FILL; Gravel, Sand and Silt, Moderate brown (5YR3/4), sand and silt -70%, gravel -30%; Cinders and Slag at 0.8'; Very pale orange (10YR8/2) to Grayish black (N2).	Complete borehole number is B3890R717.
SS	2.0	1.3	4 3 2 1				54.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
							52.7					Augered to 2.0'.
SS	2.0	1.3	1 1 1 11				52.0 51.7				4.3 - 8.4 ft: Silty CLAY, (CL); Dusky yellowish brown (10YR2/2) mottled with Grayish black (N2) changing to Light olive gray (5Y5/2) at 6.0', very fine grained, clay -60 - 70%, silt -30 - 40%, medium plasticity, moist.	Augered to 4.0'.
SS	2.0	1.6	20 10 15 18				50.7 50.0	5				Augered to 6.0'.
SS	2.0	1.8	6 19 21 27				48.4 48.0 47.6				8.4 - 10.1 ft: Silty SAND, (SM); Dusky yellowish brown (10YR2/2), fine to medium grained, well sorted, subrounded grains, no plasticity, moist.	Augered to 8.0'.
							46.2 46.0					Augered to 10.0'.
SS	0.3	0.3	50/4"				45.9 45.7 45.0	10			10.1 - 12.3 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, weathered, blocky, brittle, micaceous.	Spoon refusal at 10.3'. Augered to 11.0'.
SS	2.0	1.3	14 25 26 22				43.7 43.0					Augered to total depth of 13.0'.
										TOTAL DEPTH = 13.0 FT.	3" PVC casing inserted to 13.0' for gamma-logging.	
											PVC casing was removed after logging; hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.	
											* Core recovery refers to total rock & soil sample.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination of sample.	
											Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; SX = HAND AUGER; O = OTHER				SITE			Stepan Property			Last Update: 03-19-92	HOLE NO. R717	



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R718**

SITE: **Stepan Property** COORDINATES: **N 9174.0; E 9972.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **1-10-91** COMPLETED: **1-10-91** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **4.9** ROCK (FT.): **3.1** TOTAL DEPTH: **8.0**

CORE RECOVERY (FT./%): **6.1/76*** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **54.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **4.9/49.1**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.5	2 16 12 15				54.0		0.0 - 0.8 ft: Clayey SILT, (ML); Moderate brown (5YR3/4), moist.	Complete borehole number is B3890R718. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 2.0'. Augered to 4.0'. Augered to 6.0'. Augered to total depth of 8.0'. 3" PVC casing inserted to 8.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS	2.0	1.5	24 15 13 9				53.2		0.8 - 4.9 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4) changing to Moderate yellowish brown (10YR5/4) at 2.0' and to Moderate brown (5YR3/4) at 2.6'; fine to coarse grained, silt -60%, sand -40%; minor gravel between 0.8 - 1.5'; no plasticity, moist.		
SS	2.0	1.5	9 16 19 20				52.5 52.0				
SS	2.0	1.6	25 17 20 21				50.5 50.0 49.1 48.5 48.0	5	4.9 - 7.6 ft: Sandy SILT and SANDSTONE, (ML); Dark reddish brown (10R3/4), fine grained, weathered, blocky to fissile, micaceous.		
							46.4 46.0		TOTAL DEPTH = 8.0 FT.		

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **Stepan Property** Last Update: **03-19-92** HOLE NO.: **R718**



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R719

SITE

Stepan Property

COORDINATES

N 9493.0; E 10405.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

1-11-91

COMPLETED

1-11-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

6.4

ROCK (FT.)

2.1

TOTAL DEPTH

8.5

CORE RECOVERY (FT./%)

6.1/72*

CORE BOXES

0

SAMPLES

5

EL. TOP CASING

NA

GROUND EL.

57.0

DEPTH/EL. GROUND WATER

↓ / none ATD
↓ / NA

DEPTH/EL. TOP OF ROCK

6.4/50.6

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYWD)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / Z CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	P.S.I. TIME MIN.					
SS	1.0	0.8	46 50/6"			57.0				
						56.2			0.0 - 4.5 ft: FILL; Gravel, Sand and Silt. Silt with Cinders and Coal at 0.5 ft., Grayish black (N2), silt -80%, coal and cinders -20%.	Complete borehole number is B3890R719.
SS	2.0	1.5	27 16 10 8			55.0				Borehole sampled and gamma-logged by TMA/Eberline Corp.
						53.5				Spoon refusal at 1.0'. Augered to 2.0'. Augered to 4.0'.
SS	2.0	1.8	5 2 2 3			53.0 52.5	5		4.5 - 6.4 ft: Silty CLAY, (CL); Olive black (5Y2/1) mottled with Black (N1), very fine grained, high plasticity, moist.	
SS	2.0	1.5	27 28 29 27			51.2 51.0 50.6			6.4 - 8.5 ft: SANDSTONE and Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, weathered, blocky to fissile, iron cement, moist.	Augered to 6.0'.
SS	0.5	0.5	50/6"			49.5 49.0 48.5				Augered to 8.0'. Spoon refusal at 8.5'. 3" PVC casing inserted to 8.0' for gamma-logging.
									TOTAL DEPTH = 8.5 FT.	PVC casing was removed after logging; hole was grouted to -0.5' below surface and remaining hole backfilled with drilling spoils.

* Core recovery refers to total rock & soil sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update: 03-19-92

HOLE NO. R719



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R720			
Stepan Property				N 9174.0; E 9858.0		Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
1-14-91	1-14-91	Hydro Group, Inc.	Mobile B-80		8"	8.7	1.3	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.9/69*		0	5	NA	54.0	NA / NA		8.7/45.3			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.							TIME MIN.
SS	0.9	0.5	13 50/4"			54.0				0.0 - 3.4 ft: FILL.	Complete borehole number is B3890R720. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 0.9'. Augered to 2.0'. Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils. * Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
						53.5				0.0 - 2.6 ft: Sandy Silt, (ML); Moderate brown (5YR4/4) changing to Dusky yellowish brown (10YR2/2) at 2.0'.	
SS	2.0	1.8	9 27 22 14			52.0				2.6 - 3.4 ft: Cinders, slag and coal, Very pale orange (10YR8/2) to Black (N1) to Dark yellowish orange (10YR6/6).	
SS	2.0	1.5	10 9 8 10			50.6 50.2 50.0	5			3.4 - 8.7 ft: Silty SAND, (SM); Moderate brown (5YR3/4) changing to Moderate brown (5YR4/4) at 4.0', to Dark reddish brown (10R3/4) at 6.0' and to Moderate brown (5YR4/4) at 8.0', sand -60-80% content increasing with depth, silt -20-40%, medium to coarse grained, well sorted, no plasticity; some blocky to fissile, weathered sandstone fragments between 6.9 - 7.4'.	
SS	2.0	1.4	20 21 22 25			48.5 48.0					
SS	2.0	1.7	12 14 20 21			46.6 46.0 45.3					
						44.3 44.0	10			8.7 - 9.7 ft: SANDSTONE and Sandy SILT, Dark reddish brown (10R3/4), blocky, weathered, fine grained, iron-oxide cement.	
										TOTAL DEPTH = 10.0 FT.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property		Last Update: 03-19-92	HOLE NO. R720		



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R721
SITE Stepan Property		COORDINATES N 9352.0; E 10350.0		ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 1-14-91	COMPLETED 1-14-91	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 10.8	ROCK (FT.) 1.2
CORE RECOVERY (FT./%) 9.3/78*		CORE BOXES 0	SAMPLES 6	EL. TOP CASING NA	GROUND EL. 55.0	DEPTH/EL. GROUND WATER 10.8/44.2
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	1.3	1.1	55 42 50/4"				55.0			0.0 - 4.9 ft: FILL. 0.0 - 1.1 ft: Sand, silt, bricks and gravel.	Complete borehole number is B3890R721.
SS	2.0	1.8	15 14 9 7				53.9 53.0			2.0 - 3.6 ft: Cinders, gravel, and slag, Black (N1) and Medium light gray (N6).	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	6 5 2 6				51.2 51.0			3.6 - 3.8 ft: Sandy Silt, Grayish black (N2), silt -80%, sand -20%, no plasticity, moist. 4.0 - 4.9 ft: Cinders and slag, Grayish black (N1) and Very pale orange (10YR8/2).	Spoon refusal at 1.3'. Augered to 2.0'.
SS	2.0	1.7	3 16 15 22				50.1 49.7 49.2 49.0	5		4.9 - 5.3 ft: Clayey SILT, (ML); Dark gray (NS), silt -70%, clay -30%, trace very fine sand, low plasticity, moist.	
SS	2.0	1.5	17 22 34 45				48.2 47.8 47.3 47.0			5.3 - 5.8 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2), sand -60%, silt -40%, no plasticity. 6.0 - 6.8 ft: Sandy SILT, (ML); Olive gray (5Y4/1), silt -70%, fine sand -15%, clay -15%, low plasticity, moist.	
SS	2.0	1.4	9 18 46 31				45.5 45.0 44.5 44.2 43.6 43.0	10		6.8 - 7.2 ft: Silty SAND, (SM); Moderate brown (5YR5/4), fine to coarse grained, no plasticity, moist. 7.2 - 10.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4) changing to Moderate reddish brown (10R4/6) at 8.0' and to Dark yellowish brown (10YR4/2) at 9.0', some weathered, blocky, sandstone fragments.	
										10.0 - 10.5 ft: SAND, (SP); Olive black (5Y2/1), medium to coarse grained, well sorted, moist. 10.5 - 10.8 ft: Clayey SILT, (ML); Dark greenish gray (5GY4/1), silt -70%, clay -20%, sand -10%, no plasticity. 10.8 - 11.4 ft: Sandy SILT and SANDSTONE, (ML); Dark reddish brown (10R3/4), fine to medium grained, blocky, weathered, iron-oxide cement, no plasticity.	Augered to total depth of 12.0'. 3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
TOTAL DEPTH = 12.0 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Stepan Property	Last Update: 03-19-92	HOLE NO. R721
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R722
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9922.0; E 10389.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-14-91	1-14-91	Hydro Group, Inc.	Mobile B-80		8"	3.0	2.0	5.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.7/74*		0	3	NA	67.0	NA		3.0/64.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.4	3				67.0					(Template: MYWD) 0.0 - 0.6 ft: Sandy SILT, (ML); Moderate brown (5YR3/4), with grass, moist. 0.6 - 3.0 ft: Clayey SILT, (ML); Light brown (5YR5/6), fine grained, silt -70%, clay -20%, sand -10%, no plasticity, moist. 3.0 - 4.8 ft: SANDSTONE; Dark reddish brown (10R3/4), weathered, blocky, fine grained, iron-oxide cement. TOTAL DEPTH = 5.0 FT.	Complete borehole number is B3890R722. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 4.8'. Augered to total depth of 5.0'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.
			8				66.4						
			6				65.6						
			4				65.0						
SS	2.0	1.5	3				64.0						
			8				63.5						
			21				63.0						
			27				62.2						
SS	0.9	0.8	28				62.0						
			50/4"				62.0						

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R722
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		ANGLE FROM HORIZ	BEARING					
Stepan Property				N 9258.0; E 10458.0		Vertical	-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
1-14-91	1-14-91	Hydro Group, Inc.	Mobile B-80	8"	10.8	1.2	12.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
4.8/40*		0	6	NA	56.0	/ NA	10.8/45.2					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140 lbs/30 in		none		Stephen Knuttel								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.0	5 6 11 18				56.0				0.0 - 8.3 ft: FILL.	Complete borehole number is B3890R723.
SS	2.0	0.7	10 15 11 12				55.0				0.0 - 2.7 ft: Debris; red brick fragments; slag, white (N9) to Black (N1), with sand and gravel.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	5 5 10 14				54.0				4.0 - 5.0 ft: Sandy Gravel; Black (N1), mixed composition, trace sandstone, gravel up to 5 cm, loose, wet.	
SS	2.0	0.3	12 18 15 15				53.3	5			5.0 - 10.0 ft: Slag fragments, Light brown (5YR5/6) to Moderate brown (5YR4/4 - 5YR3/4) to Pale brown (5YR5/6), with Black (N1) and White (N9), fragments are hard, loose, moist; cement fragments between 6.0 - 6.3'; with fine sand, Black (N1), between 8.0 - 8.3'.	
SS	1.7	0.3	5 18 50 50/3"				52.0				5.0 - 10.0 ft: Slag fragments, Light brown (5YR5/6) to Moderate brown (5YR4/4 - 5YR3/4) to Pale brown (5YR5/6), with Black (N1) and White (N9), fragments are hard, loose, moist; cement fragments between 6.0 - 6.3'; with fine sand, Black (N1), between 8.0 - 8.3'.	
SS	1.7	1.2	20 30 47 50/3"				50.7				10.0 - 10.8 ft: SAND, (SW); Moderate reddish brown (10R4/6), fine grained, moderately sorted, firm, moist.	Spoon refusal at 9.7'. Augered to 10.0'.
							50.0				10.8 - 11.2 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine with sandstone gravel, poorly sorted, firm, moist.	Spoon refusal at 11.7'. Augered to total depth of 12.0'.
							49.7				TOTAL DEPTH = 12.0 FT.	3" PVC casing inserted to 12.0' for gamma-logging.
							48.0					PVC casing was removed after logging; hole was backfilled with grout and drilling spoils.
							47.7					* Core recovery refers to total rock & soil sample.
							46.0	10				Ground elevation estimated from site topographic map.
							45.2					Description & classification by visual examination of sample.
							44.8					Colors from "Rock-Color Chart" (GSA, 1948).
							44.0					

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Stepan Property

Last Update:
03-19-92

HOLE NO.
R723



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.						
SITE				COORDINATES		14501	1 OF 1	R724						
Stepan Property				N 9746.0; E 10454.0		ANGLE FROM HORIZ		BEARING						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
1-14-91	1-14-91	Hydro Group, Inc.	Mobile B-80		8"	4.0	2.0	6.0						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
4.8/80*		0	3	NA	64.0	V / NA		4.0/68.0						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:									
140 lbs/30 in		none			Robert Cook									
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS				ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS	G.P.M.	P.S.F.	TIME MIN.						
SS	1.5	1.4	24					64.0					(Template: MYWD) 0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 1.2 ft: FILL; Black (N1), asphalt, gravel and cinders. 1.2 - 3.8 ft: Sandy SILT, (ML); Grayish brown (5YR3/2) changing to Moderate reddish brown (10R4/6) at 2.8', fine grained, silt -70%, sand -30%, no plasticity. 4.0 - 5.8 ft: Gravelly, Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, no plasticity. TOTAL DEPTH = 6.0 FT.	Complete borehole number is B3890R724. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to total depth of 6.0'. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.
			29					63.8						
			17					62.7						
SS	2.0	1.6	13					62.1						
			24					62.0						
			33											
			31											
SS	1.9	1.8	27					60.4						
			33					60.0						
			31											
			50/5"					58.2						
								58.0						
SS = SPLIT SPOON; NQ = CORE BARREL; SITE HX = HAND AUGER; O = OTHER													Stepan Property Last Update: 03-19-92 HOLE NO. R724	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R725			
Stepan Property				N 9716.0; E 10488.0		ANGLE FROM HORIZ		BEARING			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
1-15-91	1-15-91	Hydro Group, Inc.	Mobile B-80		8"	6.7	2.3	9.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
7.2/80*		0	3	NA	67.0	NA		6.7/60.3			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BL. CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.						
SS	2.0	1.3	2 3 2			67.0				(Template: MYWD)	
SS	2.0	1.6	1 2 2			65.7				0.0 - 2.8 ft: Silty SAND, (SM); Moderate brown (5YR4/4), fine to medium grained, sand -70%, silt -30%, trace clay, no plasticity, moist.	Complete borehole number is B3890R725.
SS	2.0	1.4	3 6 11			65.0 64.2 63.4 63.0 62.7				2.8 - 4.3 ft: Clayey SILT, (ML); fine to medium grained, silt -60%, clay -20%, sand -20%, medium plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.5	1.4	16 37 50			61.6 61.0 60.3	5			4.3 - 6.7 ft: Silty SAND, (SM); Light brown (5Y5/6), fine to medium grained, moist.	
SS	1.5	1.5	32 27 50			59.6 59.5				6.7 - 9.0 ft: Sandy SILT and SANDSTONE, (ML); Dark reddish brown (10R3/4), fine to medium grained, trace coarse grains, weathered, blocky, iron-oxide cement, moist.	
						58.0				TOTAL DEPTH = 9.0 FT.	Augered to total depth of 9.0'. 3" PVC casing inserted to 9.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.
* Core recovery refers to total rock & soil sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Stepan Property			Last Update: 03-19-92	HOLE NO. R725	



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R726
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Stepan Property			N 9755.0; E 10520.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-15-91	1-15-91	Hydro Group, Inc.	Mobile B-80		8"	5.0	1.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.3/55*		0	3	NA	68.0	NA		5.0/63.0		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.3	5 7 9 11				68.0				0.0 - 2.3 ft: FILL.	Complete borehole number is B3890R726. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to total depth of 6.0'. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging; hole was backfilled with drilling spoils.	
							66.7				0.0 - 0.9 ft: Silty Sand, Grayish brown (5YR3/2), topsoil with minor roots, some slag, cement fragments between 0.9 - 1.1'.		
SS	2.0	0.6	4 4 4 4				66.0 65.7 65.4				1.1 - 2.3 ft: Slag, mixed Moderate brown (5YR3/4), Black (N1) and Very light gray (N8), fine to coarse sand size, loose, slightly moist.		
SS	2.0	1.4	3 4 6 20				64.0				2.3 - 5.0 ft: Silty SAND, (SM); Moderate brown (5YR4/4), fine grained, moderately sorted, minor sandstone gravel below 4.0', moderately firm, moist.		
							63.0 62.6 62.0	5			5.0 - 5.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), fine to medium sand, moderately sorted, gravel is sandstone, firm, moist.		
TOTAL DEPTH = 6.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Stepan Property	Last Update: 03-19-92	HOLE NO. R726
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REMEDIAL INVESTIGATION REPORT

FOR THE MAYWOOD SITE

NEW JERSEY

VOLUME III

DECEMBER 1992

Prepared for

United States Department of Energy

Oak Ridge Field Office

Under Contract No. DE-AC05-91OR21949

By

Bechtel National, Inc.

Oak Ridge, Tennessee

Bechtel Job No. 14501

APPENDIX D

Chemical Data and Geologic Logs for MISS
(Storage Pile and Onsite)

Contents

MISS STORAGE PILE CHEMICAL DATA

Table		Page
D-1	Volatile Organic Compounds, MISS Storage Pile, Soil Samples	D-1
D-2	BNAEs, MISS Storage Pile, Soil Samples	D-6
D-3	PCBs, MISS Storage Pile, Soil Samples	D-16
D-4	Pesticides/PCBs, MISS Storage Pile, Soil Samples	D-37
D-5	Total Petroleum Hydrocarbons, MISS Storage Pile, Soil Samples	D-43
D-6	TCLP Metals, MISS Storage Pile, Soil Samples	D-46
D-7	TCLP Volatile Organic Compounds, MISS Storage Pile, Soil Samples	D-72
D-8	TCLP BNAEs, MISS Storage Pile, Soil Samples	D-76
D-9	TCLP Pesticides, MISS Storage Pile, Soil Samples	D-80
D-10	TCLP Herbicides, MISS Storage Pile, Soil Samples	D-84
D-11	Corrosivity/Reactivity, MISS Storage Pile, Soil Samples	D-85

MISS ONSITE CHEMICAL DATA

Table		Page
D-12	Metals and Rare Earths, MISS Onsite Soil Samples	D-113
D-13	Volatile Organic Compounds, MISS Onsite Soil Samples	D-125
D-14	BNAEs, MISS Onsite Soil Samples	D-137
D-15	PCBs, MISS Onsite Soil Samples	D-161
D-16	Pesticides/PCBs, MISS Onsite Soil Samples	D-168
D-17	Total Petroleum Hydrocarbons, MISS Onsite Soil Samples	D-180
D-18	TCLP Metals, MISS Onsite Soil Samples	D-181
D-19	TCLP Volatile Organic Compounds, MISS Onsite Soil Samples	D-194
D-20	TCLP Semivolatile Organic Compounds, MISS Onsite Soil Samples	D-206
D-21	TCLP Pesticides, MISS Onsite Soil Samples	D-219
D-22	TCLP Herbicides, MISS Onsite Soil Samples	D-232
D-23	Corrosivity/Reactivity, MISS Onsite Soil Samples	D-245
D-24	Mobile Ions, MISS Onsite Soil Samples	D-257
D-25	Downhole Gamma Logging Results, MISS Onsite	D-274

GEOLOGIC LOGS

Property	Page
MISS Storage Pile	D-313
MISS Onsite	D-385

Storage Pile Chemical Data

Table D-1
 Volatile Organic Compounds, MISS Storage Pile,
 Soil Samples

Page 1 of 5

Sample ID No.	138-PI-0003	138-PI-0011	138-PI-0012	138-PI-0014	138-PI-0017	138-PI-0018
Borehole ID No.	B3890CP018	B3890CP010	B3890CP010	B3890CP010	B3890CP011	B3890CP011
Sample Depth (ft)	6 - 8	0 - 2	2 - 4	6 - 8	2 - 6	6 - 8
Analyte						
1,1,1-TRICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,1,2,2-TETRACHLOROETHANE	6 U	6 U	1 J	6 U	6 U	6 U
1,1,2-TRICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHANE	6 U	6 U	1 J	6 U	6 U	6 U
1,1-DICHLOROETHYLENE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	1 J	6 U	6 U	6 U
1,2-DICHLOROETHENE (TOTAL)	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROPROPANE	6 U	6 U	6 U	6 U	6 U	6 U
2-BUTANONE	12 R	11 R	11 R	11 R	12 J	11 R
2-CHLOROETHYLVINYLETHER		11 U	11 U	11 U	11 U	11 U
2-HEXANONE	12 U	11 U	1 J	11 U	11 U	11 U
4-METHYL-2-PENTANONE	12 U	11 U	2 J	11 U	11 U	11 U
ACETONE	160 U	10 U	180 J	47 U	82 U	35 U
ACROLEIN		11 U	11 U	11 U	11 U	11 U
ACRYLONITRILE		11 U	11 U	11 U	11 U	11 U
BENZENE	6 U	6 U	2 J	6 U	6 U	6 U
BROMODICHLOROMETHANE	6 U	6 U	6 U	6 U	6 U	6 U
BROMOFORM	6 U	6 U	6 U	6 U	6 U	6 U
BROMOMETHANE	12 U	11 U	11 U	11 U	11 U	11 U
CARBON DISULFIDE	5 J	6 U	3 J	4 J	6 U	4 J
CARBON TETRACHLORIDE	6 U	6 U	6 U	6 U	6 U	6 U
CHLOROBENZENE	6 U	6 U	6 U	6 U	6 U	6 U
CHLOROETHANE	12 U	11 U	11 U	11 U	11 U	11 U
CHLOROFORM	6 U	6 U	6 U	6 U	6 U	6 U
CHLOROMETHANE	12 U	11 U	11 U	11 U	11 U	11 U
CIS-1,3-DICHLOROPROPENE	6 U	6 U	6 U	6 U	6 U	6 U
DIBROMOCHLOROMETHANE	6 U	6 U	6 U	6 U	6 U	6 U
ETHYLBENZENE	6 U	6 U	6 U	6 U	6 U	6 U
METHYLENE CHLORIDE	13 U	6 U	18 U	9 U	14 U	12 U
STYRENE	6 U	6 U	6 U	6 U	6 U	6 U
TETRACHLOROETHYLENE	6 U	6 U	6 U	6 U	6 U	6 U
TOLUENE	6 U	18 =	410 *	530 *	790 *	270 E
TRANS-1,3-DICHLOROPROPENE	6 U	6 U	6 U	6 U	6 U	6 U
TRICHLOROETHYLENE	6 U	6 U	2 J	6 U	6 U	6 U
VINYL ACETATE	12 U	11 U	11 U	11 U	11 U	11 U
VINYL CHLORIDE	12 U	11 U	11 U	11 U	11 U	11 U
XYLENES (TOTAL)	6 U	6 U	6 U	6 U	6 U	6 U

D-1

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

B - The analyte is found in the associated blank as well as the sample.

E - The compound was detected at a concentration exceeding the calibration range and was subsequently analyzed at a dilution.

= - No data qualifier required.

* - Results reported from more diluted sample.

Table D-1
(continued)

Page 2 of 5

Sample ID No.	138-PI-0038	138-PI-0043	138-PI-0051	138-PI-0067	138-PI-0071	138-PI-0080
Borehole ID No.	B3890CP032	B3890CP035	B3890CP037	B3890CP014	B3890CP015	B3890CP008
Sample Depth (ft)	0 - 2	0 - 2	8 - 12	8 - 12	0 - 2	0 - 2
Analyte						
1,1,1-TRICHLOROETHANE	6 U	28 U	6 U	6 U	6 U	6 U
1,1,2,2-TETRACHLOROETHANE	6 U	28 U	6 U	6 U	6 U	6 U
1,1,2-TRICHLOROETHANE	6 U	28 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHANE	6 U	28 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHYLENE	6 U	28 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	28 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHENE (TOTAL)	6 U	28 U	6 U	6 U	6 U	6 U
1,2-DICHLOROPROPANE	6 U	28 U	6 U	6 U	6 U	6 U
2-BUTANONE	11 R	56 R	11 U	11 R	11 R	11 R
2-CHLOROETHYL VINYLETHER	11 U	56 U	11 U	11 U	11 U	11 U
2-HEXANONE	11 U	56 U	11 U	11 U	11 U	11 U
4-METHYL-2-PENTANONE	11 U	56 U	11 U	11 U	11 U	11 U
ACETONE	130 UJ	790 *	2000 *	6600 U	16 U	20 UJ
ACROLEIN	11 U	56 U	11 U	11 U	11 U	11 U
ACRYLONITRILE	11 U	56 U	11 U	11 U	11 U	11 U
BENZENE	6 U	28 U	6 U	6 U	6 U	6 U
BROMODICHLOROMETHANE	6 U	28 U	6 U	6 U	6 U	6 U
BROMOFORM	6 U	28 U	6 U	6 U	6 U	6 U
BROMOMETHANE	11 U	56 U	11 U	11 U	11 U	11 U
CARBON DISULFIDE	6 U	11 J	6 U	6 U	6 U	6 U
CARBON TETRACHLORIDE	6 U	28 U	6 U	6 U	6 U	6 U
CHLOROETHANE	6 U	28 U	6 U	6 U	6 U	6 U
CHLOROETHYLENE	11 U	56 U	11 U	11 U	11 U	11 U
CHLOROFORM	6 U	28 U	6 U	6 U	6 U	6 U
CHLOROMETHANE	11 U	56 U	11 U	11 U	11 U	11 U
CIS-1,3-DICHLOROPROPENE	6 U	28 U	6 U	6 U	6 U	6 U
DIBROMOCHLOROMETHANE	6 U	28 U	6 U	6 U	6 U	6 U
ETHYLBENZENE	6 U	28 U	6 U	6 U	6 U	6 U
METHYLENE CHLORIDE	70 UJ	540 B	1600	40 B	34 U	61 UJ
STYRENE	6 U	28 U	6 U	6 U	6 U	6 U
TETRACHLOROETHYLENE	6 U	28 U	1 J	6 U	6 U	6 U
TOLUENE	6 U	15 J	31 U	15 =	170 J	550 R
TRANS-1,3-DICHLOROPROPENE	6 U	28 U	6 U	6 U	6 U	6 U
TRICHLOROETHYLENE	6 U	28 U	6 U	6 U	6 U	6 U
VINYL ACETATE	11 UJ	56 UJ	11 UJ	11 U	11 UJ	11 U
VINYL CHLORIDE	11 U	56 U	11 U	11 U	11 U	11 U
XYLENES (TOTAL)	6 U	28 U	6 U	6 U	6 U	6 U

D-2

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

B - The analyte is found in the associated blank as well as the sample.

E - The compound was detected at a concentration exceeding the calibration range and was subsequently analyzed at a dilution.

= - No data qualifier required.

* - Results reported from more diluted sample.

R - Unreliable result. Analyte may or may not be present in the sample.

Table D-1

(continued)

Page 3 of 5

Sample ID No. Borehole ID No. Sample Depth (ft)	138-PI-0092 B3890CP016 4 - 6	138-PI-0102 B3890CP009 6 - 8	138-PI-0109 B3890CP002 6 - 8	138-PI-0111 B3890CP020 0 - 2	138-PI-0112 B3890CP020 2 - 6	138-PI-0113 B3890CP020 6 - 8
Analyte						
1,1,1-TRICHLOROETHANE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
1,1,2,2-TETRACHLOROETHANE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
1,1,2-TRICHLOROETHANE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
1,1-DICHLOROETHANE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
1,1-DICHLOROETHYLENE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
1,2-DICHLOROETHANE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
1,2-DICHLOROETHENE (TOTAL)	1 J	6 UJ	660 UJ	6 U	650 UJ	730 UJ
1,2-DICHLOROPROPANE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
2-BUTANONE	11 R	11 UJ	1300 UJ	11 R	1300 UJ	1500 UJ
2-CHLOROETHYLVINYLETHER	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
2-HEXANONE	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
4-METHYL-2-PENTANONE	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
ACETONE	50 UJ	36 UJ	5300 UJ	14 UJ	5200 UJ	9500 UJ
ACROLEIN	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
ACRYLONITRILE	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
BENZENE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
BROMODICHLOROMETHANE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
BROMOFORM	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
BROMOMETHANE	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
CARBON DISULFIDE	6 U	6 UJ	660 UJ	15 U	650 UJ	730 UJ
CARBON TETRACHLORIDE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
CHLOROBENZENE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
CHLOROETHANE	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
CHLOROFORM	6 U	6 UJ	660 UJ	1 J	650 UJ	730 UJ
CHLOROMETHANE	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
CIS-1,3-DICHLOROPROPENE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
DIBROMOCHLOROMETHANE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
ETHYLBENZENE	6 U	6 UJ	660 UJ	2 J	650 UJ	730 UJ
METHYLENE CHLORIDE	59 UJ	34 UJ	7700 UJ	45 UJ	9100 UJ	16000 UJ
STYRENE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
TETRACHLOROETHYLENE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
TOLUENE	350 R	61 J	1200 =	680 E	2700 J	2200 J
TRANS-1,3-DICHLOROPROPENE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
TRICHLOROETHYLENE	6 U	6 UJ	660 UJ	6 U	650 UJ	730 UJ
VINYL ACETATE	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
VINYL CHLORIDE	11 U	11 UJ	1300 UJ	11 U	1300 UJ	1500 UJ
XYLENES (TOTAL)	6 U	6 UJ	660 UJ	2 J	650 UJ	730 UJ

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

B - The analyte is found in the associated blank as well as the sample.

E - The compound was detected at a concentration exceeding the calibration range and was subsequently analyzed at a dilution.

= - No data qualifier required.

* - Results reported from more diluted sample.

R - Unreliable result. Analyte may or may not be present in the sample.

Table D-1
(continued)

Page 4 of 5

Sample ID No.	138-PI-0120	138-PI-0121	138-PI-0123	138-PI-0127	138-PI-0128	138-PI-0156
Borehole ID No.	B3890CP012	B3890CP012	B3890CP004	B3890CP003	B3890CP003	B3890CP022
Sample Depth (ft)	4 - 8	8 - 9.6	2 - 4	0 - 2	2 - 4	6 - 8
Analyte						
1,1,1-TRICHLOROETHANE	6 U	710 U	6 U	6 U	5 U	6 U
1,1,2,2-TETRACHLOROETHANE	6 U	710 U	6 U	6 U	5 U	6 U
1,1,2-TRICHLOROETHANE	6 U	710 U	6 U	6 U	5 U	6 U
1,1-DICHLOROETHANE	6 U	710 U	6 U	6 U	5 U	6 U
1,1-DICHLOROETHYLENE	6 U	710 U	6 U	6 U	5 U	6 U
1,2-DICHLOROETHANE	6 U	710 U	6 U	6 U	5 U	6 U
1,2-DICHLOROETHENE (TOTAL)	6 U	710 U	6 U	6 U	5 U	6 U
1,2-DICHLOROPROPANE	6 U	710 U	6 U	6 U	5 U	6 U
2-BUTANONE	11 UR	1400 UR	11 UR	11 UR	10 U	11 R
2-CHLOROETHYL VINYLETHER	11 UR	1400 UR	11 UR	11 UR	10 U	11 U
2-HEXANONE	11 U	1400 U	11 U	11 U	10 U	11 U
4-METHYL-2-PENTANONE	11 U	1400 U	11 U	11 U	10 U	11 U
ACETONE	120 BJ	7900 B	55 UJ	61 B	90 B	41 U
ACROLEIN	11 U	1400 U	11 U	11 U	10 U	11 U
ACRYLONITRILE	11 U	1400 U	11 U	11 U	10 U	11 U
BENZENE	2 J	710 U	6 U	6 U	5 U	6 U
BROMODICHLOROMETHANE	6 U	710 U	6 U	6 U	5 U	6 U
BROMOFORM	6 U	710 U	6 U	6 U	5 U	6 U
BROMOMETHANE	11 U	1400 U	11 U	11 U	10 U	11 U
CARBON DISULFIDE	7 =	710 U	5 J	6 U	4 J	6 U
CARBON TETRACHLORIDE	6 U	710 U	6 U	6 U	5 U	6 U
CHLOROBENZENE	6 U	710 U	6 U	6 U	5 U	6 U
CHLOROETHANE	11 U	1400 U	11 U	11 U	10 U	11 U
CHLOROFORM	6 U	710 U	6 U	6 U	5 U	6 U
CHLOROMETHANE	11 U	1400 U	11 U	11 U	10 U	11 U
CIS-1,3-DICHLOROPROPENE	6 U	710 U	6 U	6 U	5 U	6 U
DIBROMOCHLOROMETHANE	6 U	710 U	6 U	6 U	5 U	6 U
ETHYLBENZENE	1 J	710 U	1 J	6 U	5 U	6 U
METHYLENE CHLORIDE	37 UJ	11000 B	42 UJ	31 UJ	40 UJ	41 U
STYRENE	6 U	710 U	6 U	6 U	5 U	6 U
TETRACHLOROETHYLENE	6 U	710 U	6 U	6 U	5 U	6 U
TOLUENE	640 =	3000 =	360 =	1 J	300 =	3 J
TRANS-1,3-DICHLOROPROPENE	6 U	710 U	6 U	6 U	5 U	6 U
TRICHLOROETHYLENE	4 J	710 U	15 =	6 U	5 U	6 U
VINYL ACETATE	11 U	1400 U	11 U	11 U	10 U	11 U
VINYL CHLORIDE	11 U	1400 U	11 U	11 U	10 U	11 U
XYLENES (TOTAL)	6 U	710 U	6 U	6 U	5 U	6 U

D-4

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

B - The analyte is found in the associated blank as well as the sample.

E - The compound was detected at a concentration exceeding the calibration range and was subsequently analyzed at a dilution.

= - No data qualifier required.

* - Results reported from more diluted sample.

R - Reliable result. Analyte may or may not be present in the sample.

Table D-1
(continued)

Page 5 of 5

Sample ID No.	138-PI-0160		138-PI-0059		138-PI-0060		138-PI-0062
Borehole ID No.	B3890CP022		B3890CP028		B3890CP028		B3890CP028
Sample Depth (ft)	12 - 14.5		2 - 4		4 - 6		8 - 11
Analyte							
1,1,1-TRICHLOROETHANE	8	U	6	U	6	U	720 U
1,1,2,2-TETRACHLOROETHANE	8	U	6	U	6	U	720 U
1,1,2-TRICHLOROETHANE	8	U	6	U	6	U	720 U
1,1-DICHLOROETHANE	8	U	6	U	6	U	720 U
1,1-DICHLOROETHYLENE	8	U	6	U	6	U	720 U
1,2-DICHLOROETHANE	8	U	6	U	6	U	720 U
1,2-DICHLOROETHENE (TOTAL)	8	U	6	U	6	U	720 U
1,2-DICHLOROPROPANE	8	U	6	U	6	U	720 U
2-BUTANONE	16	R	11	R	11	R	1400 U
2-CHLOROETHYLVINYLETHER	16	U	11	U	11	U	1400 U
2-HEXANONE	16	U	11	U	6	J	1400 U
4-METHYL-2-PENTANONE	16	U	11	U	11	U	1400 U
ACETONE	53	U	14	U	170	U	1400 U
ACROLEIN	16	U	11	U	11	U	1400 U
ACRYLONITRILE	16	U	11	U	11	U	1400 U
BENZENE	8	U	6	U	11	U	720 U
BROMODICHLOROMETHANE	8	U	6	U	6	U	720 U
BROMOFORM	8	U	6	U	6	U	720 U
BROMOMETHANE	16	U	11	U	11	U	1400 U
CARBON DISULFIDE	8	U	6	U	6	U	720 U
CARBON TETRACHLORIDE	8	U	6	U	6	U	720 U
CHLOROBENZENE	8	U	6	U	6	U	720 U
CHLOROETHANE	16	U	11	U	11	U	1400 U
CHLOROFORM	8	U	6	U	6	U	720 U
CHLOROMETHANE	16	U	11	U	11	U	1400 U
CIS-1,3-DICHLOROPROPENE	8	U	6	U	6	U	720 U
DIBROMOCHLOROMETHANE	8	U	6	U	6	U	720 U
ETHYLBENZENE	8	U	6	U	6	U	720 U
METHYLENE CHLORIDE	30	U	41	U	140	U	720 U
STYRENE	8	U	6	U	6	U	720 U
TETRACHLOROETHYLENE	8	U	6	U	6	U	720 U
TOLUENE	2	J	6	U	93	U	1700 U
TRANS-1,3-DICHLOROPROPENE	8	U	6	U	6	U	720 U
TRICHLOROETHYLENE	8	U	6	U	6	U	720 U
VINYL ACETATE	16	U	11	UJ	11	UJ	1400 U
VINYL CHLORIDE	16	U	11	U	11	U	1400 U
XYLENES (TOTAL)	8	U	6	U	2	J	720 U

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

B - The analyte is found in the associated blank as well as the sample.

E - The compound was detected at a concentration exceeding the calibration range and was subsequently analyzed at a dilution.

Table D-2
BNAEs, MISS Storage Pile,
Soil Samples

Page 1 of 10

Sample ID No.	138-PI-0003	138-PI-0011	138-PI-0012	138-PI-0014	138-PI-0017	138-PI-0018		
Drillhole ID No.	B3890CP018	B3890CP010	B3890CP010	B3890CP010	B3890CP011	B3890CP011		
Sample Depth (ft)	6 - 8	0 - 2	2 - 4	6 - 8	2 - 6	6 - 8		
Analyte								
2,4-TRICHLOROBENZENE	380	U	420	U	410	U	410	U
2-DICHLOROBENZENE	380	U	420	U	410	U	410	U
2-DIPHENYLHYDRAZINE	380	U	420	U	410	U	410	U
3-DICHLOROBENZENE	380	U	420	U	410	U	410	U
4-DICHLOROBENZENE	380	U	420	U	410	U	410	U
4,5-TRICHLOROPHENOL	83	J	2100	U	2000	U	2100	U
4,6-TRICHLOROPHENOL	380	U	420	U	410	U	410	U
4-DICHLOROPHENOL	150	J	420	U	410	U	410	U
4-DIMETHYLPHENOL	380	U	420	U	410	U	410	U
4-DINITROPHENOL	1900	U	2100	U	2000	U	2100	U
4-DINITROTOLUENE	380	U	420	U	410	U	410	U
6-DINITROTOLUENE	380	U	420	U	410	U	410	U
CHLORONAPHTHALENE	380	U	420	U	410	U	410	U
CHLOROPHENOL	41	J	420	U	410	U	410	U
METHYLNAPHTHALENE	66	J	99	J	410	U	410	U
METHYLPHENOL	380	UJ	420	U	410	U	410	U
NITROANILINE	1900	U	2100	U	2000	U	2100	U
NITROPHENOL	380	U	420	U	410	U	410	U
3'-DICHLOROBENZIDINE	770	U	850	U	810	U	820	U
NITROANILINE	1900	U	2100	U	2000	U	2100	U
6-DINITRO-2-METHYLPHENOL	1900	U	2100	U	2000	U	2100	U
BROMOPHENYL-PHENYLETHER	380	U	420	U	410	U	410	U
CHLORO-3-METHYLPHENOL	380	U	420	U	410	U	410	U
CHLORDANILINE	380	U	420	U	410	U	410	U
CHLOROPHENYL-PHENYLETHER	380	U	420	U	410	U	410	U
METHYLPHENOL	380	U	420	U	120	J	410	U
NITROANILINE	1900	U	2100	U	2000	U	2100	U
NITROPHENOL	1900	U	2100	U	2000	U	2100	U
ENAPHTHENE	52	J	85	J	410	U	410	U
ENAPHTHYLENE	380	U	170	J	410	U	55	J
THRACENE	130	J	240	J	52	J	410	U
NZIDINE	1900	U	2100	U	2000	U	2100	U
NZO(A)ANTHRACENE	370	J	650	=	190	J	240	J
NZO(A)PYRENE	310	J	540	=	150	J	220	J
NZO(B)FLUORANTHENE	250	J	430	=	120	J	210	J
NZO(G,H,I)PERYLENE	220	J	340	J	99	J	130	J

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.
- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

Page 2 of 10

Sample ID No. Borehole ID No. Sample Depth (ft)	138-PI-0003 B3890CP018 6 - 8	138-PI-0011 B3890CP010 0 - 2	138-PI-0012 B3890CP010 2 - 4	138-PI-0014 B3890CP010 6 - 8	138-PI-0017 B3890CP011 2 - 6	138-PI-0018 B3890CP011 6 - 8
Analyte						
BENZO(K)FLUORANTHENE	280 J	390 J	150 J	190 J	210 J	150 J
BENZOIC ACID	1900 U	200 J	110 J	120 J	200 J	99 J
BENZYL ALCOHOL	380 UJ	420 U	410 U	410 U	410 U	410 U
BIS(2-CHLOROETHOXY)METHANE	380 U	420 U	410 U	410 U	410 U	410 U
BIS(2-CHLOROETHYL)ETHER	380 U	420 U	410 U	410 U	410 U	410 U
BIS(2-CHLOROISOPROPYL)ETHER	380 UJ	420 U	410 U	410 U	410 U	410 U
BIS(2-ETHYLHEXYL)PHTHALATE	400 U	300 J	210 J	420 =	440 =	210 J
BUTYLBENZYLPHTHALATE	380 U	420 U	410 U	410 U	410 U	410 U
CHRYSENE	430 =	700 =	200 J	230 J	260 J	220 J
DI-N-BUTYLPHTHALATE	62 J	84 J	58 J	71 J	61 J	85 J
DI-N-OCTYLPHTHALATE	380 U	420 U	410 U	410 U	410 U	410 U
DIBENZ(A,H)ANTHRACENE	380 U	110 J	410 U	410 U	52 J	41 J
DIBENZOFURAN	380 U	80 J	410 U	410 U	410 U	410 U
DIETHYLPHTHALATE	61 J	420 U	410 U	410 U	410 U	410 U
DIMETHYLPHTHALATE	380 U	420 U	410 U	410 U	410 U	410 U
FLUORANTHENE	640 =	1300 =	390 J	310 J	420 =	350 J
FLUORENE	69 J	190 J	410 U	410 U	410 U	410 U
HEXACHLOROBENZENE	380 U	420 U	410 U	410 U	410 U	410 U
HEXACHLOROBUTADIENE	380 U	420 U	410 U	410 U	410 U	410 U
HEXACHLOROCYCLOPENTADIENE	380 U	420 U	410 U	410 U	410 U	410 U
HEXACHLORODETHANE	380 UJ	420 U	410 U	410 U	410 U	410 U
INDENO(1,2,3-CD)PYRENE	210 J	280 J	83 J	94 J	120 J	100 J
ISOPHORONE	380 U	420 U	410 U	410 U	410 U	410 U
N-NITROSO-DI-N-PROPYLAMINE	380 UJ	420 U	410 U	410 U	410 U	410 U
N-NITROSODIMETHYLAMINE	380 U	420 U	410 U	410 U	410 U	410 U
N-NITROSODIPHENYLAMINE	380 U	420 U	410 U	410 U	410 U	410 U
NAPHTHALENE	81 J	130 J	410 U	410 U	410 U	410 U
NITROBENZENE	380 U	420 U	410 U	410 U	410 U	410 U
PENTACHLOROPHENOL	1900 U	2100 U	2000 U	2100 U	2100 U	2000 U
PHENANTHRENE	500 =	1200 =	280 J	160 J	220 J	150 J
PHENOL	380 UJ	420 U	410 U	410 U	45 J	45 J
PYRENE	740 =	1100 =	290 J	310 J	320 J	260 J

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

= - No data qualifier required.

B - The analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

Page 3 of 10

Sample ID No.	138-PI-0038	138-PI-0042	138-PI-0043	138-PI-0051	138-PI-0067	138-PI-0071		
Corehole ID No.	B3890CP032	B3890CP032	B3890CP035	B3890CP037	B3890CP014	B3890CP015		
Sample Depth (ft)	0 - 2	12 - 14	0 - 2	8 - 12	8 - 12	0 - 2		
Analyte								
2,4-TRICHLOROBENZENE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
2-DICHLOROBENZENE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
2-DIPHENYLHYDRAZINE	420 UJ	390 U	420 UJ	58 J	53 J	390 U		
3-DICHLOROBENZENE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
4-DICHLOROBENZENE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
4,5-TRICHLOROPHENOL	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U		
4,6-TRICHLOROPHENOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
4-DICHLOROPHENOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
4-DIMETHYLPHENOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
4-DINITROPHENOL	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U		
4-DINITROTOLUENE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
6-DINITROTOLUENE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
1-CHLORONAPHTHALENE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
2-CHLOROPHENOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
1-METHYLNAPHTHALENE	44 J	390 U	420 UJ	44 J	450 U	390 U		
2-METHYLPHENOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
3-NITROANILINE	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U		
4-NITROPHENOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
3,4-DICHLOROBENZIDINE	840 UJ	780 U	830 UJ	840 UJ	890 U	770 U		
4-NITROANILINE	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U		
2,6-DINITRO-2-METHYLPHENOL	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U		
4-BROMOPHENYL-PHENYLETHER	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
2-CHLORO-3-METHYLPHENOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
2-CHLOROANILINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
4-CHLOROPHENYL-PHENYLETHER	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
2-METHYLPHENOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U		
3-NITROANILINE	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U		
4-NITROPHENOL	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U		
CENAPHTHENE	420 UJ	390 U	420 UJ	420 UJ	50 J	390 U		
CENAPHTHYLENE	75 J	390 U	52 J	49 J	450 U	59 J		
ANTHRACENE	120 J	390 U	77 J	89 J	160 J	80 J		
ACENAPHTHIDINE	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U		
ENZO(A)ANTHRACENE	500 J	93 J	320 J	360 J	570 =	350 J		
ENZO(A)PYRENE	380 J	54 J	280 J	300 J	670 =	600 =		
ENZO(B)FLUORANTHENE	380 J	72 J	280 J	330 J	680 =	620 =		
ENZO(G,H,I)PERYLENE	450 J	390 U	300 J	320 J	240 J	460 =		

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.
- J - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

Page 4 of 10

Site ID No.	138-PI-0038	138-PI-0042	138-PI-0043	138-PI-0051	138-PI-0067	138-PI-0071
Sample ID No.	B3890CP032	B3890CP032	B3890CP035	B3890CP037	B3890CP014	B3890CP015
Sample Depth (ft)	0 - 2	12 - 14	0 - 2	8 - 12	8 - 12	0 - 2
Analyte						
20(K)FLUORANTHENE	290 J	65 J	180 J	210 J	600 =	700 =
20IC ACID	250 J	120 J	2100 UJ	120 J	2200 U	160 J
2YL ALCOHOL	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
2-CHLOROETHOXY)METHANE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
2-CHLOROETHYL)ETHER	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
2-CHLOROISOPROPYL)ETHER	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
2-ETHYLHEXYL)PHTHALATE	170 J	110 J	420 UJ	420 UJ	450 U	390 U
4-BENZYLPHthalate	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
4-SENE	500 J	93 J	350 J	360 J	680 =	500 =
4-BUTYLPHthalate	420 U	86 JB	420 UJ	91 UJ	450 U	390 U
4-OCTYLPHthalate	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-1,4-DIHYDROANTHRACENE	43 J	390 U	130 J	140 J	99 J	140 J
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	900 J	170 J	600 J	660 J	1100 =	600 =
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	51 J	390 U	420 UJ	420 UJ	74 J	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	390 J	390 U	270 J	300 J	240 J	450 =
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	420 UJ	390 U	420 UJ	420 UJ	450 U	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	2100 UJ	1900 U	2100 UJ	2100 UJ	2200 U	1900 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	490 J	130 J	300 J	340 J	640 =	290 J
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	76 J	390 U	46 J	180 J	68 J	390 U
1,2,3,4-TETRAHYDRO-2H-PYRIDINE	630 J	150 J	380 J	410 J	840 =	620 =

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Analyte present; reported as an estimated value.

Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

No data qualifier required.

The analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

5 of 10

File ID No. Well ID No. Well Depth (ft)	138-PI-0080 B3890CP008 0 - 2	138-PI-0092 B3890CP016 4 - 6	138-PI-0102 B3890CP009 6 - 8	138-PI-0109 B3890CP002 6 - 8	138-PI-0111 B3890CP020 0 - 2	138-PI-0112 B3890CP020 2 - 6
Analyte						
4-TRICHLOROBENZENE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
DICHLOROBENZENE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
DIPHENYLHYDRAZINE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
DICHLOROBENZENE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
DICHLOROBENZENE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
5-TRICHLOROPHENOL	2100 UJ	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
6-TRICHLOROPHENOL	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
DICHLOROPHENOL	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
DIMETHYLPHENOL	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
DINITROPHENOL	2100 UJ	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
DINITROTOLUENE	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
DINITROTOLUENE	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
LORONAPHTHALENE	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
LOROPHENOL	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
THYLNAPHTHALENE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
THYLPHENOL	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
TROANILINE	2100 UJ	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
TROPHENOL	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
-DICHLOROBENZIDINE	830 U	800 U	840 U	840 UJ	820 UJ	800 UJ
TROANILINE	2100 UJ	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
INITRO-2-METHYLPHENOL	2100 U	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
MOPHENYL-PHENYLETHER	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
ORO-3-METHYLPHENOL	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
ORDANILINE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
OROPHENYL-PHENYLETHER	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
HYLPHENOL	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
TROANILINE	2100 UJ	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
TROPHENOL	2100 UJ	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
IPHTHENE	420 UJ	400 U	48 J	44 J	410 UJ	400 UJ
IPHTHYLENE	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
ACENE	130 J	400 U	200 J	140 J	410 UJ	42 J
DINE	2100 U	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
(A)ANTHRACENE	540 =	120 J	620 =	360 J	120 J	150 J
(A)PYRENE	610 =	140 J	560 =	470 J	210 J	230 J
(B)FLUORANTHENE	620 =	150 J	550 =	420 J	240 J	170 J
(G,H,I)PERYLENE	260 J	400 U	240 J	210 J	99 J	100 J

Concentration Units - µg/kg - micrograms per kilogram.

If the analyte was not detected. The minimum quantitation limit for the sample is reported.

If the analyte was present; reported as an estimated value.

If the analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

If no data qualifier required.

If the analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

6 of 10

File ID No. Well ID No. Well Depth (ft)	138-PI-0080 B3890CP008 0 - 2	138-PI-0092 B3890CP016 4 - 6	138-PI-0102 B3890CP009 6 - 8	138-PI-0109 B3890CP002 6 - 8	138-PI-0111 B3890CP020 0 - 2	138-PI-0112 B3890CP020 2 - 6
Analyte						
1,2-DIBENZO(K)FLUORANTHENE	570 =	130 J	610 =	450 J	200 J	150 J
1,4-DICHLOROBENZENE	2100 U	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
1-PHENOL	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2-DICHLOROETHANE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2-DICHLOROETHYLENE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2-DICHLOROETHYL ETHER	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2-DICHLOROISOPROPYL ETHER	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2-DICHLOROETHYL PHTHALATE	420 U	400 U	840 UJ	420 UJ	410 UJ	400 UJ
1,3-DICHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,4-DICHLOROBENZENE	590 =	140 J	640 =	380 J	160 J	200 J
1,4-DICHLOROPHTHALATE	420 U	72 J	420 U	420 UJ	410 UJ	700 UJ
1,4-DICHLOROBENZENE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,4-DICHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROBENZENE	420 U	400 U	420 U	80 J	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	1200 =	350 J	1800 =	620 J	180 J	220 J
1,2,3,4-TETRACHLOROPHTHALATE	44 J	400 U	61 J	54 J	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 UJ	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	260 J	400 U	230 J	600 J	290 J	230 J
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	400 UJ
1,2,3,4-TETRACHLOROPHTHALATE	2100 U	2000 U	2100 U	2100 UJ	2000 UJ	2000 UJ
1,2,3,4-TETRACHLOROPHTHALATE	500 U	160 J	580 =	430 J	120 J	180 J
1,2,3,4-TETRACHLOROPHTHALATE	420 U	400 U	420 U	420 UJ	410 UJ	73 J
1,2,3,4-TETRACHLOROPHTHALATE	720 =	200 J	830 =	460 J	180 J	250 J

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Analyte present; reported as an estimated value.

Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

No data qualifier required.

The analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

Page 7 of 10

Well ID No. Sample ID No. Well Depth (ft)	138-PI-0113 B3890CP020 6 - 8	138-PI-0120 B3890CP012 4 - 8	138-PI-0121 B3890CP012 8 - 9.6	138-PI-0123 B3890CP004 2 - 4	138-PI-0127 B3890CP003 0 - 2	138-PI-0128 B3890CP003 2 - 4
Analyte						
1,4-TRICHLOROBENZENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,2-DICHLOROBENZENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,4-DIPHENYLHYDRAZINE	410 UJ	410 UJ	430 U	360 UJ	420 U	420 U
1,2-DICHLOROBENZENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,3-DICHLOROBENZENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,2,4-TRICHLOROPHENOL	2100 UJ	2000 U	2200 U	1800 UJ	2100 U	2100 U
1,3,5-TRICHLOROPHENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,2-DICHLOROPHENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,4-DIMETHYLPHENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,3-DINITROPHENOL	2100 UJ	2000 U	2200 U	1800 UJ	2100 U	2100 U
1,4-DINITROTOLUENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,3-DINITROTOLUENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-MELONAPHTHALENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-MELOROPHENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-METHYLNAPHTHALENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-METHYLPHENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-METROANILINE	2100 UJ	2000 U	2200 U	1800 UJ	2100 U	2100 U
1-METROPHENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1,2-DICHLOROBENZIDINE	820 UJ	810 U	870 U	720 UJ	840 U	840 U
1-METROANILINE	2100 UJ	2000 U	2200 U	1800 UJ	2100 U	2100 U
1,3-DINITRO-2-METHYLPHENOL	2100 UJ	2000 U	2200 U	1800 UJ	2100 U	2100 U
1-METHOMPHENYL-PHENYLETHER	410 UJ	410 U	430 U	360 U	420 U	420 U
1-MELORO-3-METHYLPHENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-MELOROANILINE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-MELOROPHENYL-PHENYLETHER	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-METHYLPHENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
1-METROANILINE	2100 UJ	2000 U	2200 U	1800 UJ	2100 U	2100 U
1-METROPHENOL	2100 UJ	2000 U	2200 U	1800 UJ	2100 U	2100 U
1-MELOPHTHENE	410 UJ	71 J	430 U	360 UJ	420 U	100 J
1-MELOPHTYLENE	410 UJ	410 U	130 J	360 UJ	420 U	110 J
1-MELORACENE	410 UJ	410 U	110 J	47 J	420 U	300 J
1-MELIDINE	2100 UJ	2000 UJ	2200 U	1800 J	2100 U	2100 U
1-MELO(A)ANTHRACENE	51 J	410 U	490 =	240 J	70 J	600 =
1-MELO(A)PYRENE	77 J	410 UJ	540 =	260 J	140 J	1000 =
1-MELO(B)FLUORANTHENE	66 J	410 UJ	550 =	220 J	160 J	780 =
1-MELO(G,H,I)PERYLENE	410 UJ	410 UJ	250 J	140 J	420 U	650 =

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Analyte present; reported as an estimated value.

Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

No data qualifier required.

The analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

ge 8 of 10

Sample ID No.	138-PI-0113	138-PI-0120	138-PI-0121	138-PI-0123	138-PI-0127	138-PI-0128
Rehole ID No.	B3890CP020	B3890CP012	B3890CP012	B3890CP004	B3890CP003	B3890CP003
Sample Depth (ft)	6 - 8	4 - 8	8 - 9.6	2 - 4	0 - 2	2 - 4
Analyte						
NZO(K)FLUORANTHENE	67 J	410 UJ	460 =	240 J	170 J	950 =
NZOIC ACID	2100 UJ	2000 U	2200 U	67 J	2100 U	73 J
NZYL ALCOHOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
S(2-CHLOROETHOXY)METHANE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
S(2-CHLOROETHYL)ETHER	410 UJ	410 U	430 U	360 UJ	420 U	420 U
S(2-CHLOROISOPROPYL)ETHER	410 UJ	410 U	430 U	360 UJ	420 U	420 U
S(2-ETHYLHEXYL)PHTHALATE	410 UJ	530 UJ	430 UJ	120 J	420 U	420 UJ
TYLBENZYLPHthalate	410 UJ	410 U	430 U	360 J	420 U	420 U
RYSENE	60 J	410 U	520 =	280 J	93 J	690 =
-N-BUTYLPHTHALATE	410 UJ	410 U	430 UJ	360 UJ	420 U	420 UJ
-N-OCTYLPHTHALATE	410 UJ	410 UJ	430 U	360 UJ	420 U	420 U
BENZ(A,H)ANTHRACENE	410 UJ	410 UJ	430 U	360 UJ	420 U	170 J
BENZOFURAN	410 UJ	410 U	430 U	360 UJ	420 U	87 J
ETHYLPHTHALATE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
METHYLPHTHALATE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
UORANTHENE	76 J	180 J	760 =	370 J	130 J	1700 =
UORENE	410 UJ	51 J	430 U	360 UJ	420 U	180 J
XACHLOROBENZENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
XACHLOROBUTADIENE	410 UJ	410 U	430 U	360 J	420 U	420 U
XACHLOROCYCLOPENTADIENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
XACHLOROETHANE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
DENO(1,2,3-CD)PYRENE	69 J	410 UJ	240 J	140 J	420 U	590 =
OPHORONE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
NITROSO-D1-N-PROPYLAMINE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
NITROSODIMETHYLAMINE	410 UJ	410 UJ	430 U	360 UJ	420 U	420 U
NITROSODIPHENYLAMINE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
PHTHALENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
TROBENZENE	410 UJ	410 U	430 U	360 UJ	420 U	420 U
NTACHLOROPHENOL	2100 UJ	2000 U	2200 U	1800 UJ	2100 U	2100 U
ENANTHRENE	57 J	410 U	320 J	180 J	82 J	1800 =
ENOL	410 UJ	410 U	430 U	360 UJ	420 U	420 U
RENE	78 J	98 J	470 =	360 J	110 J	1300 =

centration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.
- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

Page 9 of 10

Sample ID No. Borehole ID No. Sample Depth (ft)	138-PI-0156 B3890CP022 6 - 8	138-PI-0160 B3890CP022 12 - 14.5	138-PI-0059 B3890CP028 2 - 4	138-PI-0060 B3890CP028 4 - 6	138-PI-0062 B3890CP028 8 - 11
Analyte					
1,2,4-TRICHLOROBENZENE	420 U	430 U	460 UJ	540 UJ	440 UJ
1,2-DICHLOROBENZENE	420 U	430 U	460 UJ	540 UJ	440 UJ
1,2-DIPHENYLHYDRAZINE	420 U	430 U	460 UJ	540 UJ	440 U
1,3-DICHLOROBENZENE	420 U	430 U	460 UJ	540 UJ	440 UJ
1,4-DICHLOROBENZENE	420 U	430 U	460 UJ	540 UJ	440 UJ
2,4,5-TRICHLOROPHENOL	2100 U	2100 U	2300 UJ	2700 UJ	2200 U
2,4,6-TRICHLOROPHENOL	420 U	430 U	460 UJ	540 UJ	440 U
2,4-DICHLOROPHENOL	420 U	430 U	460 UJ	540 UJ	440 UJ
2,4-DIMETHYLPHENOL	420 U	430 U	460 UJ	540 UJ	440 UJ
2,4-DINITROPHENOL	2100 U	2100 U	2300 UJ	2700 UJ	2200 U
2,4-DINITROTOLUENE	420 U	430 U	460 UJ	540 UJ	440 U
2,6-DINITROTOLUENE	420 U	430 U	460 UJ	540 UJ	440 U
2-CHLORONAPHTHALENE	420 U	430 U	460 UJ	540 UJ	440 U
2-CHLOROPHENOL	420 U	430 U	460 UJ	540 UJ	440 UJ
2-METHYLNAPHTHALENE	420 U	430 U	460 UJ	540 UJ	58 J
2-METHYLPHENOL	420 U	430 U	460 UJ	540 UJ	440 UJ
2-NITROANILINE	2100 U	2100 U	2300 UJ	2700 UJ	2200 U
2-NITROPHENOL	420 U	430 U	460 UJ	540 UJ	440 UJ
3,3'-DICHLOROBENZIDINE	850 U	850 UJ	910 UJ	1100 UJ	870 UJ
3-NITROANILINE	2100 U	2100 U	2300 UJ	2700 UJ	2200 U
4,6-DINITRO-2-METHYLPHENOL	2100 U	2100 U	2300 UJ	2700 UJ	2200 U
4-BROMOPHENYL-PHENYLETHER	420 U	430 U	460 UJ	540 UJ	440 U
4-CHLORO-3-METHYLPHENOL	420 U	430 U	460 UJ	540 UJ	440 UJ
4-CHLOROANILINE	420 U	430 U	460 UJ	540 UJ	440 UJ
4-CHLOROPHENYL-PHENYLETHER	420 U	430 U	460 UJ	540 UJ	440 U
4-METHYLPHENOL	420 U	430 U	460 UJ	540 UJ	440 U
4-NITROANILINE	2100 U	2100 U	2300 UJ	2700 UJ	2200 U
4-NITROPHENOL	2100 U	2100 U	2300 UJ	2700 UJ	2200 U
ACENAPHTHENE	420 U	160 J	54 J	540 UJ	230 J
ACENAPHTHYLENE	420 U	90 J	460 UJ	87 J	68 J
ANTHRACENE	51 J	550 =	130 J	230 J	740 =
BENZIDINE	2100 U	2100 U	2300 UJ	2700 UJ	2200 UJ
BENZO(A)ANTHRACENE	130 J	1000 J	390 J	1200 J	1500 J
BENZO(A)PYRENE	210 J	1200 =	480 =	1500 =	1500 =
BENZO(B)FLUORANTHENE	170 J	1000 =	420 J	1400 =	1300 =
BENZO(G,H,I)PERYLENE	130 J	510 J	380 J	640 =	650 =

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

= - No data qualifier required.

UJ - The analyte is found in the associated blank as well as the sample.

Table D-2
(continued)

e 10 of 10

Sample ID No.	138-P1-0156	138-P1-0160	138-P1-0059	138-P1-0060	138-P1-0062
Well ID No.	B3890CP022	B3890CP022	B3890CP028	B3890CP028	B3890CP028
Sample Depth (ft)	6 - 8	12 - 14.5	2 - 4	4 - 6	8 - 11
Analyte					
ZO(K)FLUORANTHENE	180 J	1100 =	410 J	1300 =	1500 =
ZOIC ACID	2100 U	2100 U	210 J	220 J	130 J
ZYL ALCOHOL	420 UJ	430 UJ	460 UJ	540 UJ	440 UJ
(2-CHLOROETHOXY)METHANE	420 U	430 U	460 UJ	540 UJ	440 UJ
(2-CHLOROETHYL)ETHER	420 U	430 U	460 UJ	540 UJ	440 UJ
(2-CHLOROISOPROPYL)ETHER	420 U	430 U	460 UJ	540 UJ	440 U
(2-ETHYLHEXYL)PHTHALATE	420 U	1300 U	460 UJ	540 UJ	440 UJ
YL BENZYL PHTHALATE	420 U	430 UJ	460 UJ	540 UJ	440 UJ
YSENE	190 J	1100 J	420 J	1100 J	1400 J
N-BUTYL PHTHALATE	420 U	430 U	460 UJ	540 UJ	440 U
N-OCTYL PHTHALATE	420 U	430 U	460 UJ	540 UJ	440 U
ENZ(A,H)ANTHRACENE	420 UJ	230 J	460 UJ	240 J	330 J
ENZOFURAN	420 U	120 J	460 UJ	55 J	210 J
THYL PHTHALATE	420 U	430 U	460 UJ	540 UJ	440 U
ETHYL PHTHALATE	420 U	430 U	460 UJ	540 UJ	440 U
ORANTHENE	270 J	2100 =	670 J	2300 J	3300 =
ORENE	420 U	330 J	67 J	110 J	360 J
ACHLOROBENZENE	420 U	430 U	460 UJ	540 UJ	440 U
ACHLOROBUTADIENE	420 U	430 U	460 UJ	540 UJ	440 UJ
ACHLOROCYCLOPENTADIENE	420 UJ	430 UJ	460 UJ	540 UJ	440 U
ACHLOROETHANE	420 U	430 U	460 UJ	540 UJ	440 UJ
ENO(1,2,3-CD)PYRENE	320 J	1400 =	330 J	650 =	700 =
PHORONE	420 U	430 U	460 UJ	540 UJ	440 UJ
ITROSO-DI-N-PROPYLAMINE	420 U	430 U	460 UJ	540 UJ	440 UJ
ITROSODIMETHYLAMINE	420 U	430 U	460 UJ	540 UJ	440 U
ITROSODIPHENYLAMINE	420 U	430 U	460 UJ	540 UJ	440 U
THALENE	420 U	430 U	460 UJ	540 UJ	61 J
ROBENZENE	420 U	430 U	460 UJ	540 UJ	440 UJ
ACHLOROPHENOL	2100 U	430 U	2300 UJ	2700 UJ	2200 U
ANTHRENE	170 J	1900 =	440 J	1000 J	2400 =
COL	420 U	430 U	460 U	540 UJ	440 UJ
ENE	200 J	1400 J	690 =	1900 J	2600 J

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Analyte present; reported as an estimated value.

Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

No data qualifier required.

The analyte is found in the associated blank as well as the sample.

Table D-3
PCBs, MISS Storage Pile,
Soil Samples

1 of 21

Sample ID No.	138-PI-0001	138-PI-0002	138-PI-0003	138-PI-0004	138-PI-0005	138-PI-0006
Well ID No.	B3890CP018	B3890CP018	B3890CP018	B3890CP018	B3890CP018	B3890CP019
Well Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 12	12 - 14	0 - 2
Analyte						
LOR-1016	130 U	110 U	160 U	140 U	120 U	140 U
LOR-1221	130 U	110 U	160 U	140 U	120 U	140 U
LOR-1232	130 U	110 U	160 U	140 U	120 U	140 U
LOR-1242	130 U	110 U	160 U	140 U	120 U	140 U
LOR-1248	130 U	110 U	160 U	140 U	120 U	140 U
LOR-1254	270 U	220 U	320 U	280 U	240 U	270 U
LOR-1260	270 U	220 U	320 U	280 U	240 U	270 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
 Analyte present; reported as an estimated value.

Table D-3

(continued)

Page 2 of 21

Sample ID No.	138-PI-0007	138-PI-0008	138-PI-0009	138-PI-0010	138-PI-0015	138-PI-0016
Well ID No.	B3890CP019	B3890CP019	B3890CP019	B3890CP019	B3890CP010	B3890CP011
Well Depth (ft)	2 - 6	6 - 8	8 - 12	12 - 14	8 - 10	0 - 2
Analyte						
CLOR-1016	160 U	190 U	140 U	130 U	1300 UJ	670 U
CLOR-1221	160 U	190 U	140 U	130 U	1300 UJ	670 U
CLOR-1232	160 U	190 U	140 U	130 U	1300 UJ	670 U
CLOR-1242	160 U	190 U	140 U	130 U	1300 UJ	670 U
CLOR-1248	160 U	190 U	140 U	130 U	1300 UJ	670 U
CLOR-1254	320 U	380 U	290 U	260 U	2700 UJ	1300 U
CLOR-1260	320 U	380 U	290 U	260 U	2700 UJ	1300 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
 Analyte present; reported as an estimated value.

Table D-3
(continued)

of 21

ID No. e ID No. Depth (ft)	138-PI-0019 B3890CP031 0 - 2	138-PI-0020 B3890CP031 2 - 6	138-PI-0021 B3890CP031 6 - 8	138-PI-0039 B3890CP032 2 - 6	138-PI-0040 B3890CP032 6 - 8	138-PI-0041 B3890CP032 8 - 10
yte						
-1016	670 U	690 U	660 U	140 U	140 U	140 U
-1221	670 U	690 U	660 U	140 U	140 U	140 U
-1232	670 U	690 U	660 U	140 U	140 U	140 U
-1242	670 U	690 U	660 U	140 U	140 U	140 U
-1248	670 U	690 U	660 U	140 U	140 U	140 U
-1254	1300 U	1400 U	1300 U	280 U	280 U	270 U
-1260	1300 U	1400 U	1300 U	280 U	280 U	270 U

ration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

analyte was not detected. The minimum quantitation limit for the sample is reported.
lyte present; reported as an estimated value.

Table D-3
(continued)

4 of 21

Sample ID No.	138-PI-0044	138-PI-0045	138-PI-0046	138-PI-0047	138-PI-0048	138-PI-0049
Core ID No.	B3890CP035	B3890CP035	B3890CP035	B3890CP035	B3890CP037	B3890CP037
Sample Depth (ft)	2 - 7	7 - 9	9 - 11	11 - 13	0 - 2	2 - 6
Analyte						
DR-1016	140 U	140 U	700 U	140 U	140 U	140 U
DR-1221	140 U	140 U	700 U	140 U	140 U	140 U
DR-1232	140 U	140 U	700 U	140 U	140 U	140 U
DR-1242	140 U	140 U	700 U	140 U	140 U	140 U
DR-1248	140 U	140 U	700 U	140 U	140 U	140 U
DR-1254	280 U	280 U	1400 U	280 U	270 U	280 U
DR-1260	280 U	280 U	1400 U	280 U	270 U	280 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 - Analyte present; reported as an estimated value.

Table D-3
(continued)

5 of 21

File ID No.	138-PI-0050	138-PI-0063	138-PI-0064	138-PI-0065	138-PI-0066	138-PI-0068
Sample ID No.	B3890CP037	B3890CP028	B3890CP014	B3890CP014	B3890CP014	B3890CP027
Sample Depth (ft)	6 - 8	11 - 13	0 - 2	2 - 6	6 - 8	0 - 2
File No.						
Analyte						
OR-1016	140000 U	140 U	130 U	160 U	140 U	150 U
OR-1221	140000 U	140 U	130 U	160 U	140 U	150 U
OR-1232	140000 U	140 U	130 U	160 U	140 U	150 U
OR-1242	140000 U	140 U	130 U	160 U	140 U	150 U
OR-1248	140000 U	140 U	130 U	160 U	48 J	150 U
OR-1254	280000 U	290 U	270 U	320 U	270 U	300 U
OR-1260	280000 U	290 U	270 U	320 U	270 U	300 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

If the analyte was not detected. The minimum quantitation limit for the sample is reported.
If the analyte is present; reported as an estimated value.

Table D-3
(continued)

Sample ID No.	138-PI-0069	138-PI-0070	138-PI-0072	138-PI-0076	138-PI-0077	138-PI-0078
Sample ID No.	B3890CP027	B3890CP027	B3890CP015	B3890CP007	B3890CP007	B3890CP007
Sample Depth (ft)	2 - 4	4 - 8	2 - 4	0 - 2	2 - 6	6 - 8
DR-1016	120 U	140 U	120 U	150 U	150 U	130 U
DR-1221	120 U	140 U	120 U	150 U	150 U	130 U
DR-1232	120 U	140 U	120 U	150 U	150 U	130 U
DR-1242	120 U	140 U	120 U	150 U	150 U	130 U
DR-1248	120 U	140 U	120 U	150 U	150 U	130 U
DR-1254	240 U	280 U	250 U	290 U	300 U	250 U
DR-1260	240 U	280 U	250 U	290 U	300 U	250 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 - The analyte was present; reported as an estimated value.

Table D-3
(continued)

of 21

D No. ID No. Depth (ft)	138-PI-0079 B3890CP007 8 - 12	38-PI-0081 B3890CP008 2 - 6	138-PI-0082 B3890CP008 6 - 8	138-PI-0083 B3890CP008 8 - 10	138-PI-0084 B3890CP008 10 - 12	138-PI-0086 B3890CP017 0 - 2
1016	120 U	140 U	140 U	130 U	130 U	130 U
1221	120 U	140 U	140 U	130 U	130 U	130 U
1232	120 U	140 U	140 U	130 U	130 U	130 U
1242	120 U	140 U	140 U	130 U	130 U	130 U
1248	120 U	140 U	140 U	130 U	130 U	130 U
1254	250 U	270 U	280 U	270 U	270 U	270 U
1260	250 U	270 U	280 U	270 U	270 U	270 U

ation Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

analyte was not detected. The minimum quantitation limit for the sample is reported.
 yte present; reported as an estimated value.

Table D-3
(continued)

Page 8 of 21

Sample ID No.	138-PI-0087	138-PI-0088	138-PI-0089	138-PI-0090	138-PI-0091	138-PI-0093
Borehole ID No.	B3890CP017	B3890CP017	B3890CP017	B3890CP016	B3890CP016	B3890CP016
Sample Depth (ft)	2 - 4	6 - 9	6 - 8	9 - 11.1	2 - 4	6 - 10
Analyte						
AROCLOR-1016	130 U	140 U	130 U	140 U	140 U	140 U
AROCLOR-1221	130 U	140 U	130 U	140 U	140 U	140 U
AROCLOR-1232	130 U	140 U	130 U	140 U	140 U	140 U
AROCLOR-1242	130 U	140 U	130 U	140 U	140 U	140 U
AROCLOR-1248	130 U	140 U	130 U	140 U	140 U	140 U
AROCLOR-1254	270 U	270 U	270 U	280 U	280 U	270 U
AROCLOR-1260	270 U	270 U	270 U	280 U	280 U	270 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
J - Analyte present; reported as an estimated value.

Table D-3
(continued)

Page 9 of 21

Sample ID No.	138-PI-0094	138-PI-0095	138-PI-0099	138-PI-0100	138-PI-0101	138-PI-0103
Borehole ID No.	B3890CP016	B3890CP016	B3890CP017	B3890CP009	B3890CP009	B3890CP009
Sample Depth (ft)	10 - 12	12 - 15	11 - 13	0 - 2	2 - 6	8 - 12
Analyte						
AROCLOR-1016	140 U	140 U	140 U	130 U	140 U	150 U
AROCLOR-1221	140 U	140 U	140 U	130 U	140 U	150 U
AROCLOR-1232	140 U	140 U	140 U	130 U	140 U	150 U
AROCLOR-1242	140 U	140 U	140 U	130 U	140 U	150 U
AROCLOR-1248	140 U	140 U	140 U	130 U	140 U	150 U
AROCLOR-1254	270 U	280 U	270 U	270 U	280 U	290 U
AROCLOR-1260	270 U	280 U	270 U	270 U	280 U	290 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

Table D-3
(continued)

Page 10 of 21

Sample ID No.	138-PI-0104	138-PI-0105	138-PI-0106	138-PI-0107	138-PI-0108	138-PI-0110
Borehole ID No.	B3890CP009	B3890CP009	B3890CP009	B3890CP002	B3890CP002	B3890CP002
Sample Depth (ft)	8 - 12	12 - 14.6	14.6 - 19	0 - 2	2 - 6	8 - 10
Analyte						
AROCLOR-1016	120 U	140 U	110 U	40 U	41 U	40 U
AROCLOR-1221	120 U	140 U	110 U	40 U	41 U	40 U
AROCLOR-1232	120 U	140 U	110 U	40 U	41 U	40 U
AROCLOR-1242	120 U	140 U	110 U	40 U	41 U	40 U
AROCLOR-1248	120 U	140 U	110 U	40 U	41 U	40 U
AROCLOR-1254	250 U	280 U	230 U	80 U	82 U	80 U
AROCLOR-1260	250 U	280 U	230 U	80 U	82 U	80 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
J - Analyte present; reported as an estimated value.

Table D-3
(continued)

Page 11 of 21

Sample ID No.	138-PI-0114	138-PI-0118	138-PI-0119	138-PI-0122	138-PI-0125					
Borehole ID No.	B3890CP020	B3890CP012	B3890CP012	B3890CP004	B3890CP004					
Sample Depth (ft)	2 - 6	0 - 2	2 - 4	0 - 2	4 - 5.6					
Analyte										
AROCLOR-1016	41	U	42	U	40	U	44	U	44	U
AROCLOR-1221	41	U	42	U	40	U	44	U	44	U
AROCLOR-1232	41	U	42	U	40	U	44	U	44	U
AROCLOR-1242	41	U	42	U	40	U	44	U	44	U
AROCLOR-1248	41	U	42	U	40	U	44	U	44	U
AROCLOR-1254	82	U	84	U	80	U	88	U	88	U
AROCLOR-1260	82	U	84	U	80	U	88	U	88	U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

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Table D-3
(continued)

Page 12 of 21

Sample ID No.	138-PI-0126	138-PI-0129	138-PI-0131	138-PI-0132	138-PI-0133	138-PI-0135
Borehole ID No.	B3890CP004	B3890CP003	B3890CP003	B3890CP003	B3890CP003	B3890CP015
Sample Depth (ft)	6 - 8	4 - 6	6 - 8	8 - 10	10 - 12	0 - 2
Analyte						
AROCLOR-1016	46 U	44 U	45 U	45 U	45 U	44 U
AROCLOR-1221	46 U	44 U	45 U	45 U	45 U	44 U
AROCLOR-1232	46 U	44 U	45 U	45 U	45 U	44 U
AROCLOR-1242	46 U	44 U	45 U	45 U	45 U	44 U
AROCLOR-1248	46 U	44 U	45 U	45 U	45 U	44 U
AROCLOR-1254	92 U	89 U	90 U	90 U	90 U	89 U
AROCLOR-1260	92 U	89 U	90 U	90 U	90 U	89 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 J - Analyte present; reported as an estimated value.

Table D-3
(continued)

Sample ID No.	138-PI-0136	138-PI-0137	138-PI-0138	138-PI-0142	138-PI-0143	138-PI-0144
Borehole ID No.	B3890CP016	B3890CP015	B3890CP015	B3890CP006	B3890CP006	B3890CP006
Sample Depth (ft)	2 - 6	6 - 8	8 - 12	0 - 2	2 - 6	6 - 8
Analyte						
AROCLOR-1016	40 U	44 U	45 U	45 U	45 U	45 U
AROCLOR-1221	40 U	44 U	45 U	45 U	45 U	45 U
AROCLOR-1232	40 U	44 U	45 U	45 U	45 U	45 U
AROCLOR-1242	40 U	44 U	45 U	45 U	45 U	45 U
AROCLOR-1248	40 U	44 U	45 U	45 U	45 U	45 U
AROCLOR-1254	80 U	89 U	90 U	90 U	91 U	91 U
AROCLOR-1260	80 U	89 U	90 U	90 U	91 U	91 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

J - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

Table D-3
(continued)

Page 14 of 21

Sample ID No.	138-PI-0145	138-PI-0146	138-PI-0147	138-PI-0148	138-PI-0149	138-PI-0150
Recovery ID No.	B3890CP006	B3890CP030	B3890CP030	B3890CP030	B3890CP030	B3890CP030
Sample Depth (ft)	8 - 12	0 - 2	2 - 4	4 - 8	4 - 8	8 - 9.1
Analyte						
DCLOR-1016	46 U	45 U	45 U	46 U	43 U	44 U
DCLOR-1221	46 U	45 U	45 U	46 U	43 U	44 U
DCLOR-1232	46 U	45 U	45 U	46 U	43 U	44 U
DCLOR-1242	46 U	45 U	45 U	46 U	43 U	44 U
DCLOR-1248	46 U	45 U	45 U	46 U	43 U	44 U
DCLOR-1254	93 U	90 U	91 U	92 U	86 U	89 U
DCLOR-1260	93 U	90 U	91 U	92 U	86 U	89 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-3
(continued)

Page 15 of 21

Sample ID No.	138-PI-0151	138-PI-0152	138-PI-0157	138-PI-0158	138-PI-0161	138-PI-0162
Well ID No.	B3890CP022	B3890CP022	B3890CP022	B3890CP022	B3890CP024	B3890CP024
Well Depth (ft)	0 - 2	2 - 6	8 - 10	10 - 12	0 - 2	2 - 4
Analyte						
Chloroform	43 U	43 U	45 UJ	45 UJ	45 U	45 UJ
Chloroform	43 U	43 U	45 UJ	45 UJ	45 U	45 UJ
Chloroform	43 U	43 U	45 UJ	45 UJ	45 U	45 UJ
Chloroform	43 U	43 U	45 UJ	45 UJ	45 U	31 J
Chloroform	43 U	43 U	45 UJ	45 UJ	45 U	45 UJ
Chloroform	86 U	87 U	90 UJ	90 UJ	91 U	91 UJ
Chloroform	86 U	87 U	90 UJ	90 UJ	91 U	91 UJ

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Analyte present; reported as an estimated value.

Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-3
(continued)

6 of 21

Sample ID No.	138-PI-0163	138-PI-0164	138-PI-0165	138-PI-0167	138-PI-0169	138-PI-0176
Sample ID No.	B3890CP024	B3890CP024	B3890CP024	B3890CP030	B3890CP030	B3890CP033
Depth (ft)	4 - 6	6 - 10	10 - 12	9 - 10.7	10.7 - 13.1	0 - 2
Chloride						
JR-1016	46 U	45 U	45 U	46 U	46 U	46 U
JR-1221	46 U	45 U	45 U	46 U	46 U	46 U
JR-1232	46 U	45 U	45 U	46 U	46 U	46 U
JR-1242	46 U	45 U	45 U	46 U	46 U	46 U
JR-1248	46 U	45 U	45 U	46 U	46 U	46 U
JR-1254	92 U	90 U	91 U	91 U	91 U	92 U
JR-1260	92 U	90 U	91 U	91 U	91 U	92 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 - The analyte is present; reported as an estimated value.

Table D-3
(continued)

17 of 21

Well ID No.	138-PI-0177	138-PI-0178	138-PI-0180	138-PI-0181	138-PI-0183	138-PI-0184
Well ID No.	B3890CP033	B3890CP029	B3890CP029	B3890CP036	B3890CP036	B3890CP013
Well Depth (ft)	2 - 4	0 - 2	2 - 4	0 - 2	2 - 4	0 - 2
Analyte						
LOR-1016	47 U	45 U	46 U	40 U	47 U	49 U
LOR-1221	47 U	45 U	46 U	40 U	47 U	49 U
LOR-1232	47 U	45 U	46 U	40 U	47 U	49 U
LOR-1242	47 U	45 U	46 U	40 U	47 U	49 U
LOR-1248	47 U	45 U	46 U	40 U	47 U	49 U
LOR-1254	94 U	89 U	92 U	79 U	33 J	98 U
LOR-1260	94 U	89 U	92 U	79 U	93 U	98 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
Analyte present; reported as an estimated value.

Table D-3
(continued)

3 of 21

ID No.	138-PI-0185	138-PI-0186	138-PI-0187	138-PI-0206	138-PI-0207
File ID No.	B3890CP013	B3890CP021	B3890CP021	B3890CP005	B3890CP005
Depth (ft)	2 - 4	0 - 2	2 - 4	0 - 2	2 - 6
lyte					
z-1016	48 U	45 U	45 U	44 U	41 U
z-1221	48 U	45 U	45 U	44 U	41 U
z-1232	48 U	45 U	45 U	44 U	41 U
z-1242	48 U	45 U	45 U	44 U	41 U
z-1248	48 U	45 U	45 U	44 U	41 U
z-1254	95 U	90 U	91 U	88 U	82 U
z-1260	95 U	90 U	91 U	88 U	82 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - analyte was not detected. The minimum quantitation limit for the sample is reported.
 - analyte present; reported as an estimated value.

Table D-3
(continued)

of 21	138-PI-0208		138-PI-0210		138-PI-0211		138-PI-0212		138-PI-0213		138-PI-0215	
D No.	B3890CP005		B3890CP001		B3890CP001		B3890CP026		B3890CP026		B3890CP026	
ID No.	6 - 8.5		0 - 2		2 - 6		0 - 2		2 - 4		4 - 6	
Depth (ft)												
1016	45	U	43	U	44	U	45	U	43	U	44	U
1221	45	U	43	U	44	U	45	U	43	U	44	U
1232	45	U	43	U	44	U	45	U	43	U	44	U
1242	45	U	43	U	44	U	45	U	43	U	44	U
1248	45	U	43	U	44	U	45	U	43	U	44	U
1254	90	U	86	U	87	U	90	U	86	U	87	U
1260	90	U	86	U	87	U	90	U	86	U	87	U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - analyte was not detected. The minimum quantitation limit for the sample is reported.
 E - analyte present; reported as an estimated value.

Table D-3
(continued)

of 21	138-PI-0216		138-PI-0217		138-PI-0058		138-PI-0192		138-PI-0193	
D No.	B3890CP025		B3890CP025		B3890CP028		B3890CP023		B3890CP023	
Depth (ft)	0 - 2		2 - 4		0 - 2		0 - 2		2 - 4	
1016	46	U	44	U	140	U	39	U	42	U
1221	46	U	44	U	140	U	39	U	42	U
1232	46	U	44	U	140	U	39	U	42	U
1242	46	U	44	U	140	U	39	U	42	U
1248	46	U	44	U	140	U	39	U	42	U
1254	91	U	87	U	270	U	77	U	84	U
1260	91	U	87	U	270	U	77	U	84	U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - analyte was not detected. The minimum quantitation limit for the sample is reported.
 N - analyte present; reported as an estimated value.

Table D-3
(continued)

of 21

D No. ID No. epth (ft)	138-P1-0195 B3890CP023 6 - 8.5	138-P1-0197 B3890CP034 0 - 2	138-P1-0198 B3890CP034 2 - 4	138-P1-0200 B3890CP034 4 - 6	138-P1-0201 B3890CP034 6 - 8
te					
1016	45 U	44 U	45 U	44 U	43 U
1221	45 U	44 U	45 U	44 U	43 U
1232	45 U	44 U	45 U	44 U	43 U
1242	45 U	44 U	45 U	44 U	43 U
1248	45 U	44 U	45 U	44 U	43 U
1254	90 U	88 U	90 U	88 U	85 U
1260	90 U	88 U	90 U	88 U	85 U

ation Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

analyte was not detected. The minimum quantitation limit for the sample is reported.
 yte present; reported as an estimated value.

Table D-4
Pesticides/PCBs,
MISS Storage Pile, Soil Samples

Page 1 of 6

Sample ID No.	138-PI-0003	138-PI-0011	138-PI-0012	138-PI-0014	138-PI-0017	138-PI-0018
Well ID No.	B3890CP018	B3890CP010	B3890CP010	B3890CP010	B3890CP011	B3890CP011
Well Depth (ft)	6 - 8	0 - 2	2 - 4	6 - 8	2 - 6	6 - 8
ANALYTE						
1,1-DDD	2.1 J	6.9 J	35 U	36 U	2.2 J	35 UJ
1,1-DDE	17 U	37 U	35 U	36 U	18 U	35 U
1,1-DDT	17 U	37 U	35 U	36 U	18 U	35 U
DRIN	8.5 U	18 U	18 U	18 U	8.9 U	18 U
1,1-CHLORDANE	85 U	180 U	180 U	180 U	89 U	180 U
1,1-BHC	8.5 U	18 U	18 U	18 U	8.9 U	18 U
1,1-1016	85 U	180 U	180 U	180 U	89 U	180 U
1,1-1221	85 U	180 U	180 U	180 U	89 U	180 U
1,1-1232	85 U	180 U	180 U	180 U	89 U	180 U
1,1-1242	85 U	180 U	180 U	180 U	89 U	180 U
1,1-1248	85 U	180 U	180 U	180 U	89 U	180 U
1,1-1254	170 U	370 U	350 U	360 U	180 U	350 U
1,1-1260	170 U	370 U	350 U	360 U	180 U	350 U
1,1-BHC	8.5 U	18 U	18 U	18 U	8.9 U	18 U
1,1-TA-BHC	8.5 U	18 U	18 U	18 U	8.9 U	18 U
1,1-DRIN	17 U	37 U	35 U	36 U	18 U	35 U
1,1-DRIN	8.5 U	18 U	18 U	18 U	8.9 U	18 U
1,1-SULFAN I	17 U	37 U	35 U	36 U	18 U	35 U
1,1-SULFAN II	17 U	37 U	35 U	36 U	18 U	35 U
1,1-SULFAN SULFATE	17 U	37 U	35 U	36 U	18 U	35 U
1,1-DRIN	17 U	37 U	35 U	36 U	18 U	35 U
1,1-DRIN KETONE	17 U	37 U	35 U	36 U	18 U	35 U
1,1-1,1-CHLORDANE	85 U	180 U	180 U	180 U	89 U	180 U
1,1-1,1-BHC (LINDANE)	8.5 U	18 U	18 U	18 U	8.9 U	18 U
1,1-DACHLOR	8.5 U	18 UJ	18 UJ	18 UJ	8.9 UJ	18 UJ
1,1-DACHLOR EPOXIDE	8.5 U	18 U	18 U	18 U	8.9 U	18 U
1,1-DHOXYCHLOR	85 U	180 UJ	180 UJ	180 UJ	89 UJ	180 UJ
1,1-DAPHENE	170 U	370 U	350 U	360 U	180 U	350 U

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.
- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-4
(continued)

Page 2 of 6

Sample ID No.	138-PI-0038		138-PI-0042		138-PI-0043		138-PI-0051	
Borehole ID No.	B3890CP032		B3890CP032		B3890CP035		B3890CP037	
Sample Depth (ft)	0 - 2		12 - 14		0 - 2		8 - 12	
ANALYTE								
4,4'-DDD	18	U	17	U	18	U	18	UJ
4,4'-DDE	18	U	17	U	6.7	J	18	UJ
4,4'-DDT	18	U	17	U	3.7	J	18	UJ
ALDRIN	9.1	U	8.4	U	9.0	U	9.1	U
ALPHA CHLORDANE	91	U	84	U	90	U	91	U
ALPHA-BHC	9.1	U	8.4	U	9.0	U	9.1	U
AROCLOR-1016	91	U	84	U	90	U	91	U
AROCLOR-1221	91	U	84	U	90	U	91	U
AROCLOR-1232	91	U	84	U	90	U	91	U
AROCLOR-1242	91	U	84	U	90	U	91	U
AROCLOR-1248	91	U	84	U	90	U	91	U
AROCLOR-1254	180	U	170	U	180	U	180	U
AROCLOR-1260	180	U	170	U	180	U	180	U
BETA-BHC	9.1	U	8.4	U	9.0	U	9.1	U
DELTA-BHC	9.1	U	8.4	U	9.0	U	9.1	U
DIELDRIN	18	U	17	U	18	U	18	U
ENDOSULFAN I	9.1	U	8.4	U	9.0	U	9.1	U
ENDOSULFAN II	18	U	17	U	18	U	18	U
ENDOSULFAN SULFATE	18	U	17	U	18	U	18	U
ENDRIN	18	U	17	U	18	U	18	U
ENDRIN KETONE	18	U	17	U	18	U	18	U
GAMMA CHLORDANE	9.1	J	84	U	9.0	J	11	J
GAMMA-BHC (LINDANE)	9.1	U	8.4	UJ	9.0	U	9.1	U
HEPTACHLOR	9.1	U	8.4	UJ	9.0	U	9.1	U
HEPTACHLOR EPOXIDE	9.1	U	8.4	U	9.0	U	9.1	U
METHOXYCHLOR	91	U	84	U	90	U	91	U
TOXAPHENE	180	U	170	U	180	U	180	U

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-4
(continued)

Page 3 of 6

Sample ID No.	138-PI-0067		138-PI-0015		138-PI-0080		138-PI-0092	
Borehole ID No.	B3890CP014		B3890CP015		B3890CP008		B3890CP016	
Sample Depth (ft)	8 - 12		0 - 2		0 - 2		4 - 6	
ANALYTE								
4,4'-DDD	19	U	17	U	18	U	2.2	J
4,4'-DDE	19	U	17	U	18	U	17	U
4,4'-DDT	19	U	17	U	18	U	17	U
ALDRIN	9.7	U	8.3	U	9.0	U	8.7	U
ALPHA CHLORDANE	97	U	16	J	10	J	87	U
ALPHA-BHC	9.7	U	8.3	U	9.0	U	8.7	U
AROCLOR-1016	97	U	83	U	90	U	87	U
AROCLOR-1221	97	U	83	U	90	U	87	U
AROCLOR-1232	97	U	83	U	90	U	87	U
AROCLOR-1242	97	U	83	U	90	U	87	U
AROCLOR-1248	97	U	83	U	90	U	87	U
AROCLOR-1254	190	U	170	U	180	U	170	U
AROCLOR-1260	190	U	170	U	180	U	170	U
BETA-BHC	9.7	U	8.3	U	9.0	U	8.7	U
DELTA-BHC	9.7	U	8.3	U	9.0	U	8.7	U
DIELDRIN	19	U	17	U	18	U	17	U
ENDOSULFAN I	9.7	U	8.3	U	9.0	U	8.7	U
ENDOSULFAN II	19	U	17	U	18	U	17	U
ENDOSULFAN SULFATE	19	U	17	U	18	U	17	U
ENDRIN	19	U	17	U	18	U	17	U
ENDRIN KETONE	19	U	17	U	18	U	17	U
GAMMA CHLORDANE	97	U	18	J	10	J	11	J
GAMMA-BHC (LINDANE)	9.7	U	8.3	U	9.0	U	8.7	U
HEPTACHLOR	9.7	U	8.3	U	9.0	U	8.7	U
HEPTACHLOR EPOXIDE	9.7	U	8.3	U	9.0	U	8.7	U
METHOXYCHLOR	97	U	83	U	90	U	87	U
TOXAPHENE	190	U	170	U	180	U	170	U

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
J - Analyte present; reported as an estimated value.

Table D-4
(continued)

Page 4 of 6

Sample ID No.	138-PI-0102	138-PI-0109	138-PI-0111	138-PI-0112	138-PI-0113
Borehole ID No.	B3890CP009	B3890CP002	B3890CP020	B3890CP020	B3890CP020
Sample Depth (ft)	6 - 8	6 - 8	0 - 2	2 - 6	6 - 8
ANALYTE					
4,4'-DDD	18 U	3.8 J	18 UJ	17 UJ	18 UJ
4,4'-DDE	18 U	18 UJ	18 UJ	17 UJ	18 UJ
4,4'-DDT	18 U	18 UJ	18 UJ	17 UJ	18 UJ
ALDRIN	9.1 U	9.1 UJ	8.9 UJ	8.7 UJ	8.9 UJ
ALPHA CHLORDANE	91 U	91 UJ	89 UJ	12 J	89 UJ
ALPHA-BHC	9.1 U	9.1 UJ	8.9 UJ	8.7 UJ	8.9 UJ
AROCLOR-1016	91 U	91 UJ	89 UJ	87 UJ	89 UJ
AROCLOR-1221	91 U	91 UJ	89 UJ	87 UJ	89 UJ
AROCLOR-1232	91 U	91 UJ	89 UJ	87 UJ	89 UJ
AROCLOR-1242	91 U	91 UJ	89 UJ	87 UJ	89 UJ
AROCLOR-1248	91 U	91 UJ	89 UJ	87 UJ	89 UJ
AROCLOR-1254	180 U	180 UJ	180 UJ	170 UJ	180 UJ
AROCLOR-1260	180 U	180 UJ	180 UJ	170 UJ	180 UJ
BETA-BHC	9.1 U	9.1 UJ	8.9 UJ	8.7 UJ	8.9 UJ
DELTA-BHC	9.1 U	9.1 UJ	8.9 UJ	8.7 UJ	8.9 UJ
DIELDRIN	18 U	18 UJ	18 UJ	17 UJ	18 UJ
ENDOSULFAN I	9.1 U	9.1 UJ	8.9 UJ	8.7 UJ	8.9 UJ
ENDOSULFAN II	18 U	18 UJ	18 UJ	17 UJ	18 UJ
ENDOSULFAN SULFATE	18 U	18 UJ	18 UJ	17 UJ	18 UJ
ENDRIN	18 U	18 UJ	18 UJ	17 UJ	18 UJ
ENDRIN KETONE	18 U	18 UJ	18 UJ	17 UJ	18 UJ
GAMMA CHLORDANE	12 J	91 UJ	89 UJ	9.4 J	89 UJ
GAMMA-BHC (LINDANE)	9.1 U	9.1 UJ	8.9 UJ	8.7 UJ	8.9 UJ
HEPTACHLOR	9.1 U	9.1 UJ	2.2 J	8.7 UJ	8.9 UJ
HEPTACHLOR EPOXIDE	9.1 U	9.1 UJ	8.9 UJ	8.7 UJ	8.9 UJ
METHOXYCHLOR	91 U	91 UJ	89 UJ	87 UJ	89 UJ
TOXAPHENE	180 U	180 UJ	180 UJ	170 UJ	180 UJ

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-4
(continued)

Page 5 of 6

Sample ID No.	138-PI-0120		138-PI-0121		138-PI-0127		138-PI-0128	
Borehole ID No.	B3890CP012		B3890CP012		B3890CP003		B3890CP003	
Sample Depth (ft)	4 - 8		8 - 9.6		0 - 2		2 - 4	
ANALYTE								
4,4'-DDD	18	U	19	U	18	U	18	U
4,4'-DDE	18	U	19	U	18	U	18	U
4,4'-DDT	18	U	19	U	18	U	18	U
ALDRIN	8.8	U	9.4	U	9.0	U	9.1	U
ALPHA CHLORDANE	88	U	94	U	90	U	91	U
ALPHA-BHC	8.8	U	9.4	U	9.0	U	9.1	U
AROCLOR-1016	88	U	94	U	90	U	91	U
AROCLOR-1221	88	U	94	U	90	U	91	U
AROCLOR-1232	88	U	94	U	90	U	91	U
AROCLOR-1242	88	U	94	U	90	U	91	U
AROCLOR-1248	88	U	94	U	90	U	91	U
AROCLOR-1254	180	U	190	U	180	U	180	U
AROCLOR-1260	180	U	190	U	180	U	180	U
BETA-BHC	8.8	U	9.4	U	9.0	U	9.1	U
DELTA-BHC	8.8	U	9.4	U	9.0	U	9.1	U
DIELDRIN	18	U	19	U	18	U	18	U
ENDOSULFAN I	8.8	U	9.4	U	9.0	U	9.1	U
ENDOSULFAN II	18	U	19	U	18	U	18	U
ENDOSULFAN SULFATE	18	U	19	U	18	U	18	U
ENDRIN	18	U	19	U	18	U	18	U
ENDRIN KETONE	18	U	19	U	18	U	18	U
GAMMA CHLORDANE	88	U	10	J	90	U	13	J
GAMMA-BHC (LINDANE)	8.8	U	9.4	U	9.0	U	9.1	U
HEPTACHLOR	8.8	U	9.4	U	9.0	U	9.1	U
HEPTACHLOR EPOXIDE	8.8	U	9.4	U	9.0	U	9.1	U
METHOXYCHLOR	88	U	94	U	90	U	91	U
TOXAPHENE	180	U	190	U	180	U	180	U

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
J - Analyte present; reported as an estimated value.

Table D-4
(continued)

Page 6 of 6

Sample ID No.	138-PI-0156	138-PI-0160	138-PI-0059	138-PI-0060	138-PI-0062
Borehole ID No.	B3890CP022	B3890CP022	B3890CP028	B3890CP028	B3890CP028
Sample Depth (ft)	6 - 8	12 - 14.5	2 - 4	4 - 6	8 - 11
ANALYTE					
4,4'-DDD	18 U	18 U	20 U	23 U	6.3 J
4,4'-DDE	18 U	18 U	20 U	23 U	19 U
4,4'-DDT	18 U	18 U	20 U	23 U	2.4 J
ALDRIN	9.2 U	9.2 U	1.6 J	3.9 J	9.4 U
ALPHA CHLORDANE	92 U	92 U	98 U	120 U	94 U
ALPHA-BHC	9.2 U	9.2 U	9.8 U	12 U	9.4 U
AROCLOR-1016	92 U	92 U	98 U	120 U	94 U
AROCLOR-1221	92 U	92 U	98 U	120 U	94 U
AROCLOR-1232	92 U	92 U	98 U	120 U	94 U
AROCLOR-1242	92 U	92 U	98 U	120 U	94 U
AROCLOR-1248	92 U	92 U	98 U	120 U	94 U
AROCLOR-1254	180 U	180 U	200 U	230 U	190 U
AROCLOR-1260	180 U	180 U	200 U	230 U	190 U
BETA-BHC	9.2 U	9.2 U	9.8 U	12 U	9.4 U
DELTA-BHC	9.2 U	9.2 U	9.8 U	12 U	9.4 U
DIELDRIN	18 U	18 U	20 U	23 U	2.4 J
ENDOSULFAN I	9.2 U	9.2 U	9.8 U	12 U	9.4 U
ENDOSULFAN II	18 U	18 U	20 U	23 U	19 U
ENDOSULFAN SULFATE	18 U	18 U	20 U	23 U	19 U
ENDRIN	18 U	18 U	20 U	23 U	19 U
ENDRIN KETONE	18 U	18 U	20 U	23 U	19 U
GAMMA CHLORDANE	92 U	92 U	22 J	120 U	18 J
GAMMA-BHC (LINDANE)	9.2 U	9.2 U	9.8 U	12 U	9.4 U
HEPTACHLOR	9.2 U	9.2 U	9.8 U	12 U	9.4 U
HEPTACHLOR EPOXIDE	9.2 U	9.2 U	9.8 U	12 U	9.4 U
METHOXYCHLOR	92 U	92 U	98 U	120 U	94 U
TOXAPHENE	180 U	180 U	200 U	230 U	190 U

Concentration units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
J - Analyte present; reported as an estimated value.

Table D-5
Total Petroleum Hydrocarbons,
MISS Storage Pile, Soil Samples

Page 1 of 3

Sample ID No.	Borehole ID No.	Sample Depth (ft)	Concentration (mg/kg)	Flag
138-PI-0185	B3890CP13	2-4	83	=
138-PI-0186	B3890CP21	0-2	300	=
138-PI-0187	B3890CP21	2-4	110	=
138-PI-0001	B3890CP18	0-2	280	=
138-PI-0002	B3890CP18	2-6	610	=
138-PI-0003	B3890CP18	6-8	1700	=
138-PI-0004	B3890CP18	8-12	350	=
138-PI-0005	B3890CP18	12-14	210	=
138-PI-0006	B3890CP19	0-2	300	=
138-PI-0007	B3890CP19	2-6	440	=
138-PI-0008	B3890CP19	6-8	350	=
138-PI-0009	B3890CP19	8-12	220	=
138-PI-0010	B3890CP19	12-14	190	=
138-PI-0011	B3890CP10	0-2	1300	=
138-PI-0012	B3890CP10	2-4	1200	=
138-PI-0014	B3890CP10	6-8	2000	=
138-PI-0015	B3890CP10	8-10	380	=
138-PI-0016	B3890CP11	0-2	390	=
138-PI-0017	B3890CP11	2-6	2000	=
138-PI-0018	B3890CP11	6-8	1400	=
138-PI-0019	B3890CP31	0-2	490	=
138-PI-0020	B3890CP31	2-6	260	=
138-PI-0021	B3890CP31	6-8	760	=
138-PI-0038	B3890CP32	0-2	2300	B
138-PI-0039	B3890CP32	2-6	600	B
138-PI-0040	B3890CP32	6-8	150	B
138-PI-0041	B3890CP32	8-10	190	B
138-PI-0042	B3890CP32	12-14	97	B
138-PI-0043	B3890CP35	0-2	1600	B
138-PI-0044	B3890CP35	2-7	420	B
138-PI-0045	B3890CP35	7-9	410	B
138-PI-0046	B3890CP35	9-11	380	B
138-PI-0047	B3890CP35	11-13	490	B
138-PI-0048	B3890CP37	0-2	370	B
138-PI-0049	B3890CP37	2-6	330	B
138-PI-0050	B3890CP37	6-8	480	B
138-PI-0051	B3890CP37	8-12	1900	B
138-PI-0058	B3890CP28	0-2	500	B
138-PI-0059	B3890CP28	2-4	1000	B
138-PI-0060	B3890CP28	4-6	1200	B
138-PI-0061	B3890CP28	6-8	600	B
138-PI-0062	B3890CP28	8-11	1000	B
138-PI-0063	B3890CP28	11-13	460	=
138-PI-0064	B3890CP14	0-2	860	=
138-PI-0065	B3890CP14	2-6	410	=
138-PI-0066	B3890CP14	6-8	260	=
138-PI-0067	B3890CP14	8-12	2900	=
138-PI-0068	B3890CP27	0-2	500	=
138-PI-0069	B3890CP27	2-4	450	=
138-PI-0070	B3890CP27	4-8	280	=
138-PI-0071	B3890CP15	0-2	1200	=
138-PI-0072	B3890CP15	2-4	260	=
138-PI-0076	B3890CP7	0-2	290	=
138-PI-0077	B3890CP7	2-6	610	=
138-PI-0078	B3890CP7	6-8	510	=

Table D-5
(continued)

Sample ID No.	Borehole ID No.	Sample Depth (ft)	Concentration (mg/kg)	Flag
138-PI-0080	B3890CP8	0-2	2200	=
138-PI-0081	B3890CP8	2-6	840	=
138-PI-0082	B3890CP8	6-8	320	=
138-PI-0083	B3890CP8	8-10	740	=
138-PI-0084	B3890CP8	10-12	480	=
138-PI-0086	B3890CP17	0-2	220	=
138-PI-0087	B3890CP17	2-4	550	=
138-PI-0088	B3890CP17	6-9	810	=
138-PI-0089	B3890CP17	9-11.1	570	=
138-PI-0090	B3890CP16	0-2	470	=
138-PI-0091	B3890CP16	2-4	75	=
138-PI-0092	B3890CP16	4-6	1000	=
138-PI-0093	B3890CP16	6-10	720	=
138-PI-0094	B3890CP16	10-12	980	=
138-PI-0095	B3890CP16	12-15	440	=
138-PI-0099	B3890CP17	11-13	440	=
138-PI-0100	B3890CP9	0-2	660	=
138-PI-0101	B3890CP9	2-6	290	=
138-PI-0102	B3890CP9	6-8	3100	=
138-PI-0103	B3890CP9	8-12	500	=
138-PI-0104	B3890CP9	8-12	690	=
138-PI-0105	B3890CP9	12-14.6	140	=
138-PI-0106	B3890CP9	14.6-19	180	=
138-PI-0107	B3890CP2	0-2	230	=
138-PI-0108	B3890CP2	2-6	550	=
138-PI-0109	B3890CP2	6-8	1000	=
138-PI-0110	B3890CP2	8-10	620	=
138-PI-0111	B3890CP20	0-2	1400	=
138-PI-0112	B3890CP20	2-6	2000	=
138-PI-0113	B3890CP20	6-8	2100	=
138-PI-0114	B3890CP20	10-12	590	=
138-PI-0118	B3890CP12	0-2	200	=
138-PI-0119	B3890CP12	2-4	260	=
138-PI-0120	B3890CP12	4-8	1400	=
138-PI-0121	B3890CP12	8-9.6	1100	=
138-PI-0122	B3890CP4	0-2	320	=
138-PI-0123	B3890CP4	2-4	1300	=
138-PI-0125	B3890CP4	4-5.6	160	=
138-PI-0126	B3890CP4	6-8	410	=
138-PI-0127	B3890CP3	0-2	1000	=
138-PI-0128	B3890CP3	2-4	2100	=
138-PI-0129	B3890CP3	4-6	470	=
138-PI-0131	B3890CP3	6-8	290	=
138-PI-0132	B3890CP3	8-10	840	=
138-PI-0133	B3890CP3	10-12	300	=
138-PI-0135	B3890CP15	0-2	950	=
138-PI-0136	B3890CP15	2-6	610	=
138-PI-0137	B3890CP15	6-8	200	=
138-PI-0138	B3890CP15	8-12	120	=
138-PI-0142	B3890CP6	0-2	370	=
138-PI-0143	B3890CP6	2-6	510	=
138-PI-0144	B3890CP6	6-8	170	=
138-PI-0145	B3890CP6	8-12	260	=

Table D-5
(continued)

Sample ID No.	Borehole ID No.	Sample Depth (ft)	Concentration (mg/kg)	Flag
138-PI-0146	B3890CP30	0-2	470	=
138-PI-0147	B3890CP30	2-4	260	=
138-PI-0148	B3890CP30	4-8	690	=
138-PI-0149	B3890CP30	4-8	350	=
138-PI-0150	B3890CP30	8-9.1	840	=
138-PI-0151	B3890CP22	0-2	460	=
138-PI-0152	B3890CP22	2-6	620	=
138-PI-0156	B3890CP22	6-8	4200	=
138-PI-0157	B3890CP22	8-10	840	=
138-PI-0158	B3890CP22	10-12	570	=
138-PI-0160	B3890CP22	12-14.5	6100	=
138-PI-0161	B3890CP24	0-2	260	=
138-PI-0162	B3890CP24	2-4	390	=
138-PI-0163	B3890CP24	4-6	450	=
138-PI-0164	B3890CP24	6-10	470	=
138-PI-0165	B3890CP24	10-12	230	=
138-PI-0167	B3890CP30	9-10.7	220	=
138-PI-0169	B3890CP30	10.7-13.1	370	=
138-PI-0176	B3890CP33	0-2	170	=
138-PI-0177	B3890CP33	2-4	190	=
138-PI-0178	B3890CP29	0-2	290	=
138-PI-0180	B3890CP29	2-4	140	=
138-PI-0181	B3890CP36	0-2	210	=
138-PI-0183	B3890CP36	2-4	660	=
138-PI-0192	B3890CP23	0-2	63	=
138-PI-0193	B3890CP23	2-4	160	=
138-PI-0195	B3890CP23	5-8	260	=
138-PI-0197	B3890CP34	0-2	77	=
138-PI-0198	B3890CP34	2-4	66	=
138-PI-0200	B3890CP34	4-6	80	=
138-PI-0201	B3890CP34	6-8	170	=
138-PI-0206	B3890CP5	0-2	100	=
138-PI-0207	B3890CP5	2-6	590	=
138-PI-0208	B3890CP5	6-8.5	300	=
138-PI-0210	B3890CP1	0-2	290	=
138-PI-0211	B3890CP1	2-6	330	=
138-PI-0212	B3890CP26	0-2	620	=
138-PI-0213	B3890CP26	2-4	240	=
138-PI-0215	B3890CP26	4-6	270	=
138-PI-0216	B3890CP25	0-2	390	=
138-PI-0217	B3890CP25	2-4	220	=

Concentration units mg/kg - milligrams per kilogram.

B - Analyte found in associated blank.

= - No data qualifier required.

Table D-6
TCLP Metals, MISS Storage Pile,
Soil Samples

Page 1 of 26

Sample ID No.	138-PI-0001	138-PI-0002	138-PI-0003	138-PI-0004	138-PI-0005	138-PI-0006
Well ID No.	B3890CP018	B3890CP0018	B3890CP018	B3890CP018	B3890CP018	B3890CP019
Sample Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 12	12 - 14	0 - 2
Analyte						
Asenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	539 =	316 =	244 =	200 U	265 =	442 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	10.0 U	10.0 U	12.3 =	18.4 =	18.3 =	10.0 U
Copper, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Manganese, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Nickel, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.

Table D-6
(continued)

Page 2 of 26

Sample ID No.	138-PI-0007	138-PI-0008	138-PI-0009	138-PI-0010	138-PI-0011	138-PI-0012
Borehole ID No.	B3890CP019	B3890CP019	B3890CP019	B3890CP019	B3890CP010	B3890CP010
Sample Depth (ft)	2 - 6	6 - 8	8 - 12	12 - 14	0 - 2	2 - 4
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	341 =	435 =	200 U	200 U	403 =	437 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	15.7 =	10.7 =	12.0 =	14.7 =	10.0 U	11.1 =
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table D-6
(continued)

Page 3 of 26

Sample ID No.	138-PI-0014	138-PI-0015	138-PI-0016	138-PI-0017	138-PI-0018	138-PI-0019
Borehole ID No.	B3890CP010	B3890CP010	B3890CP011	B3890CP011	B3890CP011	B3890CP031
Sample Depth (ft)	6 - 8	8 - 10	0 - 2	2 - 6	6 - 8	0 - 2
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	247 =	200 U	501 =	535 =	240 =	209 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	11.2 =	17.0 =	10.0 U	13.1 =	20.6 =	12.3 =
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table D-6
(continued)

Page 4 of 26

Sample ID No.	138-PI-0020	138-PI-0021	138-PI-0038	138-PI-0039	138-PI-0040	138-PI-0041		
Borehole ID No.	B3890CP031	B3890CP031	B3890CP032	B3890CP032	B3890CP032	B3890CP032		
Sample Depth (ft)	2 - 6	6 - 8	0 - 2	2 - 6	6 - 8	8 - 10		
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	216	=	204	=	219	=	304	=
Cadmium, TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U
Chromium, TCLP Leachate	13.7	=	15.5	=	10.0	U	10.7	=
Lead, TCLP Leachate	500	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.20	U	0.20	U	0.20	U	0.20	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table D-6
(continued)

Page 5 of 26

Sample ID No.	138-PI-0042	138-PI-0043	138-PI-0044	138-PI-0045	138-PI-0046	138-PI-0047
Borehole ID No.	83890CP032	83890CP035	83890CP035	83890CP035	83890CP035	83890CP035
Sample Depth (ft)	12 - 14	0 - 2	2 - 7	7 - 9	9 - 11	11 - 13
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	236 =	208 =	214 =	289 =	248 =	200 U
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	10.0 U	10.2 =	13.0 =	16.8 =	14.3 =	10.4 =
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table D-6
(continued)

Page 6 of 26

Sample ID No.	138-PI-0048	138-PI-0049	138-PI-0050	138-PI-0051	138-PI-0063	138-PI-0064		
Corehole ID No.	B3890CP037	B3890CP037	B3890CP037	B3890CP037	B3890CP28	B3890CP014		
Sample Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 12	11 - 13	0 - 2		
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	200	U	286	=	217	=	231	=
Cadmium, TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U
Chromium, TCLP Leachate	10.6	=	16.5	=	15.2	=	40.9	=
Copper, TCLP Leachate	500	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.20	U	0.20	U	0.20	U	0.20	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Zinc, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.

Table D-6
(continued)

Page 7 of 26

Sample ID No.	138-PI-0065	138-PI-0066	138-PI-0067	138-PI-0068	138-PI-0069	138-PI-0070
Corehole ID No.	B3890CP014	B3890CP014	B3890CP014	B3890CP027	B3890CP027	B3890CP027
Sample Depth (ft)	2 - 6	6 - 8	8 - 12	0 - 2	2 - 4	4 - 8
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	200 U	218 =	223 =	200 U	200 U	200 U
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	22.3 =	22.2 =	29.5 =	13.9 =	24.3 =	28.2 =
Cobalt, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.

Table D-6

(continued)

3 of 26

Sample ID No.	138-PI-0071	138-PI-0072	138-PI-0076	138-PI-0077	138-PI-0078	138-PI-0079
Sample ID No.	B3890CP015	B3890CP015	B3890CP007	B3890CP007	B3890CP007	B3890CP007
Sample Depth (ft)	0 - 2	2 - 4	0 - 2	2 - 6	6 - 8	8 - 12
Analyte						
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	327 =	200 U	535 =	200 U	200 U	200 U
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Copper, TCLP Leachate	17.6 =	32.3 =	12.8 =	24.2 =	21.8 =	20.2 =
Chromium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Vanadium, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Iron, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Zinc, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U = analyte was not detected. The minimum detection limit for the sample is reported.
 = data qualifier required.

Table D-6
(continued)

Page 9 of 26

Sample ID No.	138-PI-0080	138-PI-0081	138-PI-0082	138-PI-0083	138-PI-0084	138-PI-0085
Drillhole ID No.	83890CP008	83890CP008	83890CP008	83890CP008	83890CP008	83890CP008
Sample Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 10	10 - 12	10 - 12
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	294 =	273 =	214 =	200 U	200 U	222 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	12.2 =	18.2 =	20.0 =	21.0 =	17.9 =	10.0 U
Copper, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.32 =	0.32 =	0.32 =	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Zinc, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.

Table D-6
(continued)

10 of 26

Well ID No. Sample ID No. Sample Depth (ft)	138-PI-0086 B3890CP017 0 - 2	138-PI-0087 B3890CP017 2 - 4	138-PI-0088 B3890CP017 6 - 9	138-PI-0089 B3890CP017 9 - 11.1	138-PI-0090 B3890CP016 0 - 2	138-PI-0091 B3890CP016 2 - 4
Analyte						
Chloride, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Lead, TCLP Leachate	256 =	200 U	200 U	200 U	346 =	481 =
Mercury, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Nitrate, TCLP Leachate	15.6 =	21.7 =	14.6 =	19.9 =	10.0 U	14.3 =
Phosphate, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Sulfate, TCLP Leachate	0.32 =	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Zinc, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Iron, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.

Table D-6
(continued)

1 of 26

ID No.	138-PI-0092	138-PI-0093	138-PI-0094	138-PI-0095	138-PI-0099	138-PI-0100
Site ID No.	B3890CP016	B3890CP016	B3890CP016	B3890CP016	B3890CP017	B3890CP009
Depth (ft)	4 - 6	6 - 10	10 - 12	12 - 15	11 - 13	0 - 2
anlyte						
c, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
l, TCLP Leachate	297 =	259 =	200 U	200 U	200 U	737 =
m, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
um, TCLP Leachate	10.1 =	16.2 =	11.0 =	10.9 =	19.6 =	10.0 U
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
y, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
um, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

If an analyte was not detected. The minimum detection limit for the sample is reported.
If a data qualifier is required.

Table D-6
(continued)

of 26

ID No.	138-PI-0101	138-PI-0102	138-PI-0103	138-PI-0104	138-PI-0105	138-PI-0106
Site ID No.	B3890CP009	B3890CP009	B3890CP009	B3890CP009	B3890CP009	B3890CP009
Depth (ft)	2 - 6	6 - 8	8 - 12	8 - 12	12 - 14.6	14.6 - 19
Chloride						
5-day BOD						
Calcium						
Cadmium						
Chromium						
Copper						
Lead						
Manganese						
Nickel						
Selenium						
Silver						
TSS						
Total Hardness						
Total Phosphorus						
Total Suspended Solids						
Total Dissolved Solids						
Total Solids						
Total Chloride						
Total Sulfate						
Total Nitrate						
Total Ammonia						
Total Nitrite						
Total Phosphate						
Total Zinc						
Total Iron						
Total Manganese						
Total Copper						
Total Lead						
Total Cadmium						
Total Chromium						
Total Nickel						
Total Selenium						
Total Silver						
Total Chloride						
Total Sulfate						
Total Nitrate						
Total Ammonia						
Total Nitrite						
Total Phosphate						
Total Zinc						
Total Iron						
Total Manganese						
Total Copper						
Total Lead						
Total Cadmium						
Total Chromium						
Total Nickel						
Total Selenium						
Total Silver						

Concentration Units - µg/L - micrograms per liter.

If an analyte was not detected. The minimum detection limit for the sample is reported.
Data qualifier required.

Table D-6
(continued)

of 26

ID No.	138-PI-0107	138-PI-0108	138-PI-0109	138-PI-0110	138-PI-0111	138-PI-0112
Site ID No.	B3890CP002	B3890CP002	B3890CP002	B3890CP002	B3890CP020	B3890CP020
Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 10	0 - 2	2 - 6
analyte						
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Chromium, TCLP Leachate	229 =	233 =	200 U	200 U	389 =	251 =
Mercury, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cadmium, TCLP Leachate	10.0 U	17.3 =	23.5 =	13.2 =	10.0 U	17.6 =
Copper, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Vanadium, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Chromium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Lead, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum detection limit for the sample is reported.
= - data qualifier required.

Table D-6
(continued)

of 26	138-PI-0113	138-PI-0114	138-PI-0118	138-PI-0119	138-PI-0120	138-PI-0121
ID No.	83890CP020	83890CP020	83890CP012	83890CP012	83890CP012	83890CP012
Depth (ft)	6 - 8	10 - 12	0 - 2	2 - 4	4 - 8	8 - 9.6
Chloride						
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	200 U	200 U	410 =	505 =	358 =	238 =
TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
TCLP Leachate	18.6 =	28.5 =	10.0 U	10.6 =	17.2 =	16.8 =
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

 Analyte was not detected. The minimum detection limit for the sample is reported.
 Data qualifier required.

Table D-6
(continued)

of 26

ID No.	138-PI-0122	138-PI-0123	138-PI-0125	138-PI-0126	138-PI-0127	138-PI-0128
Site ID No.	B3890CP004	B3890CP004	B3890CP004	B3890CP004	B3890CP003	B3890CP003
Depth (ft)	0 - 2	2 - 4	4 - 5.6	6 - 8	0 - 2	2 - 4
Chloride						
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	407 =	481 =	282 =	241 =	367 =	488 =
TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
TCLP Leachate	12.6 =	11.8 =	10.7 =	15.5 =	10.0 U	10.0 U
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum detection limit for the sample is reported.
= - data qualifier required.

Table D-6
(continued)

ID No. e ID No. Depth (ft)	138-PI-0129 B3890CP003 4 - 6	138-PI-0131 B3890CP003 6 - 8	138-PI-0132 B3890CP003 8 - 10	138-PI-0133 B3890CP003 10 - 12	138-PI-0135 B3890CP015 0 - 2	138-PI-0136 B3890CP015 2 - 6
analyte						
TCCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCCLP Leachate	299 =	237 =	203 =	228 =	328 =	234 =
TCCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
TCCLP Leachate	16.0 =	25.6 =	20.4 =	13.1 =	10.0 U	10.9 =
TCCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
TCCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum detection limit for the sample is reported.
= - data qualifier required.

Table D-6
(continued)

7 of 26

ID No.	138-PI-0137	138-PI-0138	138-PI-0142	138-PI-0143	138-PI-0144	138-PI-0145
Site ID No.	83890CP015	83890CP015	83890CP006	83890CP006	83890CP006	83890CP006
Depth (ft)	6 - 8	8 - 12	0 - 2	2 - 6	6 - 8	8 - 12
anlyte						
c, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
, TCLP Leachate	262 =	267 =	370 =	200 U	276 =	251 =
m, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
um, TCLP Leachate	14.4 =	18.0 =	10.0 U	10.2 =	15.1 =	24.5 =
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
y, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
um, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

If an analyte was not detected. The minimum detection limit for the sample is reported.
If a data qualifier is required.

Table D-6
(continued)

of 26	138-PI-0146		138-PI-0147		138-PI-0148		138-PI-0149		138-PI-0150		138-PI-0151	
ID No.	B3890CP030		B3890CP030		B3890CP030		B3890CP030		B3890CP030		B3890CP022	
Depth (ft)	0 - 2		2 - 4		4 - 8		4 - 8		8 - 9.1		0 - 2	
Chloride												
TCLP Leachate	500	U	500	U	500	U	500	U	500	U	500	U
TCLP Leachate	276	=	272	=	200	U	200	U	200	U	328	=
TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
1, TCLP Leachate	12.7	=	15.3	=	15.2	=	17.4	=	21.5	=	11.3	=
2, TCLP Leachate	500	U	500	U	500	U	500	U	500	U	500	U
TCLP Leachate	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
1, TCLP Leachate	500	U	500	U	500	U	500	U	500	U	500	U
TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

analyte was not detected. The minimum detection limit for the sample is reported.
Data qualifier required.

Table D-6
(continued)

9 of 26

ID No.	138-PI-0152	138-PI-0156	138-PI-0157	138-PI-0158	138-PI-0160	138-PI-0161
Site ID No.	B3890CP022	B3890CP022	B3890CP022	B3890CP022	B3890CP022	B3890CP024
Depth (ft)	2 - 6	6 - 8	8 - 10	10 - 12	12 - 14.5	0 - 2
Analyte						
As, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Cd, TCLP Leachate	209 =	241 =	200 U	200 U	200 U	330 =
Cr, TCLP Leachate	5.0 U	5.0 U	5.0 U	10.1 =	5.0 U	5.0 U
Cu, TCLP Leachate	19.5 =	23.0 =	25.9 =	17.1 =	18.6 =	10.0 U
Pb, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mn, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Zn, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mo, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum detection limit for the sample is reported.
= - data qualifier required.

Table D-6
(continued)

of 26	138-PI-0162	138-PI-0163	138-PI-0164	138-PI-0165	138-PI-0167	138-PI-0169
ID No.	B3890CP024	B3890CP024	B3890CP024	B3890CP024	B3890CP030	B3890CP030
Sample ID No.						
Depth (ft)	2 - 4	4 - 6	6 - 10	10 - 12	9 - 10.7	10.7 - 13.1
analyte						
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Cadmium, TCLP Leachate	498 =	465 =	200 U	200 U	200 U	271 =
Chromium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Mercury, TCLP Leachate	10.0 U	17.4 =	25.9 =	23.9 =	25.2 =	24.2 =
Copper, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Iron, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Manganese, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Zinc, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum detection limit for the sample is reported.
= - data qualifier required.

Table D-6
(continued)

of 26

D No. ID No. Depth (ft)	138-PI-0176 B3890CP033 0 - 2	138-PI-0177 B3890CP033 2 - 4	138-PI-0178 B3890CP029 0 - 2	138-PI-0180 B3890CP029 2 - 4	138-PI-0181 B3890CP036 0 - 2	138-PI-0183 B3890CP036 2 - 4
Chloride						
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	200 U	232 =	229 =	200 U	253 =	384 =
TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1, TCLP Leachate	10.0 U	10.0 =	14.4 =	13.5 =	11.9 =	10.0 U
LP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	0.61 =	0.20 U	1.3 =	0.20 U	0.20 U	0.20 U
1, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

ation Units - $\mu\text{g/L}$ - micrograms per liter.

analyte was not detected. The minimum detection limit for the sample is reported.
ata qualifier required.

Table D-6
(continued)

2 of 26

ID No.	138-P1-0184	138-P1-0185	138-P1-0186	138-P1-0187	138-P1-0206	138-P1-0207
Site ID No.	B3890CP013	B3890CP013	B3890CP021	B3890CP021	B3890CP005	B3890CP005
Depth (ft)	0 - 2	2 - 4	0 - 2	2 - 4	0 - 2	2 - 6
analyte						
As, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Cr, TCLP Leachate	200 U	263 =	244 =	307 =	522 =	582 =
Mn, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pb, TCLP Leachate	15.2 =	13.7 =	10.9 =	10.6 =	10.0 U	10.0 U
TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
V, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Zn, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Other TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum detection limit for the sample is reported.
= - data qualifier required.

Table D-6
(continued)

3 of 26

ID No. Site ID No. Depth (ft)	138-PI-0208 B3890CP005 6 - 8.5	138-PI-0210 B3890CP001 0 - 2	138-PI-0211 B3890CP001 2 - 6	138-PI-0212 B3890CP026 0 - 2	138-PI-0213 B3890CP026 2 - 4	138-PI-0215 B3890CP026 4 - 6
analyte						
Calcium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Chloride, TCLP Leachate	460 =	258 =	200 U	211 =	275 =	256 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Copper, TCLP Leachate	14.4 =	31.3 =	15.4 =	20.6 =	16.4 =	19.2 =
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Nickel, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Zinc, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Iron, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

If an analyte was not detected. The minimum detection limit for the sample is reported.
If a data qualifier is required.

Table D-6
(continued)

of 26	138-P1-0216		138-P1-0217		138-P1-0058		138-P1-0059		138-P1-0060		138-P1-0061	
ID No.	B3890CP025		B3890CP025		B3890CP028		B3890CP028		B3890CP028		B3890CP028	
Depth (ft)	0 - 2		2 - 4		0 - 2		2 - 4		4 - 6		6 - 8	
anlyte												
TCLP Leachate	500	U	500	U	500	U	500	U	500	U	500	U
TCLP Leachate	220	=	233	=	267	=	220	=	240	=	200	U
TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
n, TCLP Leachate	12.4	=	10.0	U	11.3	=	16.2	=	18.9	=	17.2	=
TCLP Leachate	500	U	500	U	500	U	500	U	500	U	500	U
TCLP Leachate	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U	0.20	U
n, TCLP Leachate	500	U	500	U	500	U	500	U	500	U	500	U
TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U

ation Units - $\mu\text{g/L}$ - micrograms per liter.

analyte was not detected. The minimum detection limit for the sample is reported.
data qualifier required.

Table D-6
(continued)

Page 25 of 26

Sample ID No.	138-PI-0062	138-PI-0192	138-PI-0193	138-PI-0195	138-PI-0197	138-PI-0198
Well ID No.	B3890CP028	B3890CP023	B3890CP023	B38980C023	B3890CP034	B3890CP034
Sample Depth (ft)	8 - 11	0 - 2	2 - 4	5 - 8	0 - 2	2 - 4
Analyte						
Asenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	200 U	288 =	225 =	200 U	200 U	200 U
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	21.7 =	10.0 U	12.7 =	22.1 =	16.1 =	21.2 =
Copper, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Nickel, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Lead, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.

Table D-6
(continued)

Page 26 of 26

	138-P1-0200		138-P1-0201	
Sample ID No.	138-P1-0200		138-P1-0201	
Borehole ID No.	B3890CP034		B3890CP034	
Sample Depth (ft)	4 - 6		6 - 8	
Analyte				
Arsenic, TCLP Leachate	500	U	500	U
Barium, TCLP Leachate	234	=	225	=
Cadmium, TCLP Leachate	5.0	U	5.0	U
Chromium, TCLP Leachate	14.1	=	16.9	=
Lead, TCLP Leachate	500	U	500	U
Mercury, TCLP Leachate	0.20	U	0.20	U
Selenium, TCLP Leachate	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- = - No data qualifier required.

Table D-7
 TCLP - Volatile Organic Compounds, MISS Storage Pile,
 Soil Samples

Page 1 of 4

Sample ID No.	138 PI 0188	138-PI-0047	138-PI-0069	138-PI-0070	138-PI-0085	138-PI-0092
Borehole ID No.	B3890CP021	B3890CP035	B3890CP027	B3890CP027	B3890CP008	B3890CP016
Sample Depth (ft)	2 - 4	11 - 13	2 - 4	4 - 8	10 - 12	4 - 6
Analyte						
1,1-DICHLOROETHYLENE	5 U	5 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	5 U	5 U	50 U	50 U	50 U	50 U
2-BUTANONE	10 U	17 =	100 U	100 U	100 U	100 U
BENZENE	5 U	17 =	110 =	50 U	50 U	50 U
CARBON TETRACHLORIDE	5 U	140 =	50 U	14 J	50 U	50 U
CHLOROBENZENE	5 U	5 U	50 U	50 U	50 U	50 U
CHLOROFORM	6 =	50 =	50 U	50 U	50 U	50 U
TETRACHLOROETHYLENE	7 =	6 =	50 U	10 J	29 J	50 U
TRICHLOROETHYLENE	5 U	5 U	50 U	50 U	50 U	50 U
VINYL CHLORIDE	10 U	10 U	100 U	100 U	100 U	100 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

= - No data qualifier required.

Table D-7
(continued)

Page 2 of 4

Sample ID No. Borehole ID No. Sample Depth (ft)	138-PI-0124 B3890CP004 2 - 4	138-PI-0130 B3890CP003 4 - 6	138-PI-0134 B3890CP003 10 - 12	138-PI-0159 B3890CP022 10 - 12	138-PI-0166 B3890CP024 10 - 12	138-PI-0168 B3890CP030 9 - 10.7
Analyte						
1,1-DICHLOROETHYLENE	25 U	5 U	5 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	25 U	17 =	5 U	50 U	50 U	10 J
2-BUTANONE	50 U	10 U	10 U	100 U	100 U	100 U
BENZENE	25 U	5 U	5 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	25 U	21 =	2 J	50 U	50 U	13 J
CHLOROBENZENE	25 U	5 U	5 U	50 U	50 U	50 U
CHLOROFORM	25 U	14 =	5 =	50 U	50 U	50 U
TETRACHLOROETHYLENE	670 =	160 =	14 =	50 U	50 U	110 =
TRICHLOROETHYLENE	5 J	62 =	6 =	50 U	50 U	31 J
VINYL CHLORIDE	50 U	10 U	10 U	100 U	100 U	100 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 J - Analyte present; reported as an estimated value.
 = - No data qualifier required.

Table D-7
(continued)

Page 3 of 4

Sample ID No.	138-PI-0179	138-PI-0182	138-PI-0194	138-PI-0199	138-PI-0202
Borehole ID No.	B3890CP029	B3890CP036	B3890CP023	B3890CP034	B3890CP034
Sample Depth (ft)	0 - 2	0 - 2	2 - 4	2 - 4	6 - 8
Analyte					
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	12 J	12 J	50 U	50 U	50 U
TETRACHLOROETHYLENE	460 =	410 =	18 J	50 U	50 U
TRICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U
VINYL CHLORIDE	100 U	100 U	100 U	100 U	100 U

Concentration Units - µg/L - micrograms per liter.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- = - No data qualifier required.

Table D-7
(continued)

Page 4 of 4

Sample ID No.	138-PI-0209	138-PI-0214
Borehole ID No.	83890CP005	83890CP026
Sample Depth (ft)	6 - 8.5	2 - 4

Analyte				
1,1-DICHLOROETHYLENE	5	U	5	U
1,2-DICHLOROETHANE	5	U	5	U
2-BUTANONE	10	U	10	U
BENZENE	5	U	5	U
CARBON TETRACHLORIDE	5	U	5	U
CHLOROBENZENE	5	U	5	U
CHLOROFORM	4	J	3	J
TETRACHLOROETHYLENE	3	J	2	J
TRICHLOROETHYLENE	5	U	5	U
VINYL CHLORIDE	10	U	10	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- = - No data qualifier required.

Table D-8
TCLP - BNAEs, MISS Storage Pile,
Soil Samples

Page 1 of 4

Sample ID No.	138 PI 0188	138-PI-0047	138-PI-0069	138-PI-0070	138-PI-0085	138-PI-0092						
Corehole ID No.	B3890CP021	B3890CP035	B3890CP027	B3890CP027	B3890CP008	B3890CP016						
Sample Depth (ft)	2 - 4	11 - 13	2 - 4	4 - 8	10 - 12	4 - 6						
Analyte												
1,4-DICHLOROBENZENE	11	U	12	U	12	U	10	U	11	U	12	U
2,4,5-TRICHLOROPHENOL	55	U	60	U	60	U	50	U	55	U	60	U
2,4,6-TRICHLOROPHENOL	11	U	12	U	12	U	10	U	11	U	12	U
2,4-DINITROTOLUENE	11	U	12	U	12	U	10	U	11	U	12	U
3-METHYLPHENOL	11	U	12	U	12	U	10	U	11	U	12	U
4-METHYLPHENOL	11	U	12	U	12	U	10	U	11	U	12	U
5-METHYLPHENOL	11	U	12	U	12	U	10	U	11	U	12	U
HEXACHLOROBENZENE	11	U	12	U	12	U	10	U	11	U	12	U
HEXACHLOROBUTADIENE	11	U	12	U	12	U	10	U	11	U	12	U
HEXACHLOROETHANE	11	U	12	U	12	U	10	U	11	U	12	U
NITROBENZENE	11	U	12	U	12	U	10	U	11	U	12	U
PENTACHLOROPHENOL	55	U	60	U	60	U	50	U	55	U	60	U
PYRIDINE	11	U	12	U	12	U	10	U	11	U	12	U

Concentration Units - µg/L - micrograms per liter.

U - Analyte present; reported as an estimated value.

J - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-8
(continued)

page 2 of 4

Sample ID No.	138-PI-0124	138-PI-0130	138-PI-0134	138-PI-0159	138-PI-0166	138-PI-0168				
Corehole ID No.	B3890CP004	B3890CP003	B3890CP003	B3890CP022	B3890CP024	B3890CP030				
Sample Depth (ft)	2 - 4	4 - 6	10 - 12	10 - 12	10 - 12	9 - 10.7				
Analyte										
,4-DICHLOROBENZENE	11	U	11	U	12	U	12	U	12	U
,4,5-TRICHLOROPHENOL	55	U	55	U	60	U	60	U	60	U
,4,6-TRICHLOROPHENOL	11	U	11	U	12	U	12	U	12	U
,4-DINITROTOLUENE	11	U	11	U	12	U	12	U	12	U
-METHYLPHENOL	11	U	11	U	12	U	12	U	12	U
-METHYLPHENOL	11	U	11	U	12	U	12	U	12	U
-METHYLPHENOL	11	U	11	U	12	U	12	U	12	U
EXACHLOROBENZENE	11	U	11	U	12	U	12	U	12	U
EXACHLOROBUTADIENE	11	U	11	U	12	U	12	U	12	U
EXACHLOROETHANE	11	U	11	U	12	U	12	U	12	U
ITROBENZENE	11	U	11	U	12	U	12	U	12	U
ENTACHLOROPHENOL	55	U	55	U	60	U	60	U	60	U
YRIDINE	11	U	11	U	12	U	12	U	12	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-8
(continued)

page 3 of 4

Sample ID No.	138-PI-0179	138-PI-0182	138-PI-0194	138-PI-196	138-PI-0199	138-PI-0202				
Corehole ID No.	B3890CP029	B3890CP036	B3890CP023	B3890CP023	B3890CP034	B3890CP034				
Sample Depth (ft)	0 - 2	0 - 2	2 - 4	0 - 0.5	2 - 4	6 - 8				
Analyte										
,4-DICHLOROBENZENE	12	U	12	U	11	U	12	U	11	U
,4,5-TRICHLOROPHENOL	60	U	60	U	60	U	60	U	55	U
,4,6-TRICHLOROPHENOL	12	U	12	U	12	U	12	U	12	U
,4-DINITROTOLUENE	12	U	12	U	12	U	12	U	12	U
-METHYLPHENOL	12	U	12	U	12	U	12	U	12	U
-METHYLPHENOL	12	U	12	U	12	U	12	U	12	U
-METHYLPHENOL	12	U	12	U	12	U	12	U	12	U
EXACHLOROBENZENE	12	U	12	U	12	U	12	U	12	U
EXACHLOROBUTADIENE	12	U	12	U	12	U	12	U	12	U
EXACHLOROETHANE	12	U	12	U	12	U	12	U	12	U
ITROBENZENE	12	U	12	U	12	U	12	U	12	U
ENTACHLOROPHENOL	60	U	60	U	60	U	5	J	60	U
YRIDINE	12	U	12	U	12	U	12	U	12	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-8
(continued)

Page 4 of 4

Sample ID No.	138-P1-0209	138-P1-0214
Borehole ID No.	B3890CP004	B3890CP026
Sample Depth (ft)	6 - 8.5	2 - 4

Analyte				
1,4-DICHLOROBENZENE	12	U	12	U
2,4,5-TRICHLOROPHENOL	60	U	60	U
2,4,6-TRICHLOROPHENOL	12	U	12	U
2,4-DINITROTOLUENE	12	U	12	U
2-METHYLPHENOL	12	U	12	U
3-METHYLPHENOL	12	U	12	U
4-METHYLPHENOL	12	U	12	U
HEXACHLOROBENZENE	12	U	12	U
HEXACHLOROBUTADIENE	12	U	12	U
HEXACHLOROETHANE	12	U	12	U
NITROBENZENE	12	U	12	U
PENTACHLOROPHENOL	60	U	60	U
PYRIDINE	12	U	12	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

Table D-9
TCLP - Pesticides, MISS Storage Pile,
Soil Samples

Page 1 of 4

Sample ID No.	138 PI 0188	138-PI-0047	138-PI-0069	138-PI-0070	138-PI-0085	138-PI-0092
Well ID No.	B3890CP021	B3890CP035	B3890CP027	B3890CP027	B3890CP008	B3890CP016
Sample Depth (ft)	2 - 4	11 - 13	2 - 4	4 - 8	10 - 12	4 - 6
Analyte						
HA CHLORDANE	1.0 U	1.0 U	0.98 U	1.0 U	0.96 U	1.2 U
RIN	0.20 U	0.21 U	0.20 U	0.20 U	0.19 U	0.23 U
MA CHLORDANE	1.0 U	1.0 U	0.98 U	1.0 U	0.96 U	1.2 U
MA-BHC (LINDANE)	0.10 U	0.10 U	0.098 U	0.10 U	0.096 U	0.12 U
TACHLOR	0.10 U	0.10 U	0.098 U	0.10 U	0.096 U	0.12 U
HOXYCHLOR	1.0 U	1.0 U	0.98 U	1.0 U	0.96 U	1.2 U
APHENE	2.0 U	2.1 U	2.0 U	2.0 U	1.9 U	2.3 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-9
(continued)

2 of 4

Well ID No.	138-PI-0124	138-PI-0130	138-PI-0134	138-PI-0159	138-PI-0166	138-PI-0168
Well ID No.	B3890CP004	B3890CP003	B3890CP003	B3890CP022	B3890CP024	B3890CP030
Well Depth (ft)	2 - 4	4 - 6	10 - 12	10 - 12	10 - 12	9 - 10.7
Analyte						
CHLORDANE	1.2 U	13 U	1.2 U	1.2 U	12 U	6.6 U
DDE	0.25 U	2.6 U	0.25 U	0.24 U	2.5 U	1.3 U
CHLORDANE	1.2 U	13 U	1.2 U	1.2 U	12 U	6.6 U
-BHC (LINDANE)	0.12 U	1.3 U	0.12 U	0.12 U	1.2 U	0.66 U
CHLOR	0.12 U	1.3 U	0.12 U	0.12 U	1.2 U	0.66 U
XYCHLOR	1.2 U	13 U	1.2 U	1.2 U	12 U	6.6 U
HENE	2.5 U	26 U	2.5 U	2.4 U	25 U	13 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

When the analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-9
(continued)

Page 3 of 4

Well ID No.	138-PI-0179	138-PI-0182	138-PI-0194	138-PI-0196	138-PI-0199	138-PI-0202
Well ID No.	B3890CP029	B3890CP036	B3890CP023	B3890CP023	B3890CP034	B3890CP034
Well Depth (ft)	0 - 2	0 - 2	2 - 4	0 - 0.5	2 - 4	6 - 8
Analyte						
γ-HCHLORDANE	1.3 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U
γ-HCH	0.26 U	0.23 U	0.24 U	0.22 U	0.24 U	0.23 U
α-HCHLORDANE	1.3 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U
α-HCH (LINDANE)	0.13 U	0.12 U	0.12 U	0.11 U	0.12 U	0.11 U
γ-HCHLOR	0.13 U	0.12 U	0.12 U	0.11 U	0.12 U	0.11 U
γ-HCHLOR	1.3 U	1.2 U	1.2 U	1.1 U	1.2 U	1.1 U
γ-HCHLOR	2.6 U	2.3 U	2.4 U	2.2 U	2.4 U	2.3 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-9

(continued)

Page 4 of 4

Sample ID No.	138-PI-0209	138-PI-0214
Borehole ID No.	B3890CP005	B3890CP026
Sample Depth (ft)	6 - 8.5	2 - 4

Analyte

ALPHA CHLORDANE	1.2	U	1.1	U
ENDRIN	0.23	U	0.22	U
GAMMA CHLORDANE	1.2	U	1.1	U
GAMMA-BHC (LINDANE)	0.12	U	0.11	U
HEPTACHLOR	0.12	U	0.11	U
METHOXYCHLOR	1.2	U	1.1	U
TOXAPHENE	2.3	U	2.2	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-10
TCLP - Herbicides, MISS Storage Pile,
Soil Samples

1 of 1

Sample ID No.	138-PI-0047	138-PI-0069	138-PI-0070	138-PI-0085	138-PI-0092
Site ID No.	B3890CP035	B3890CP027	B3890CP027	B3890CP008	B3890CP016
Sample Depth (ft)	11 - 13	2 - 4	4 - 8	10 - 12	4 - 6
Analyte					
-TP (SILVEK)	1.0	1.2	1.7	0.47	1.2
	2.1	2.5	3.3	1.6	2.3
	U	U	U	J	U
	U	U	U	J	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 J - Analyte present; reported as an estimated value.

Table D-11
Corrosivity/Reactivity, MISS Storage Pile,
Soil Samples

1 of 28

ID No.	138-PI-0188	138-PI-0001	138-PI-0002	138-PI-0003	138-PI-0004	138-PI-0005
Sample ID No.	B3890CP021	B3890CP018	B3890CP018	B3890CP018	B38980CP018	B3890CP018
Depth (ft)	2 - 4	0 - 2	2 - 6	6 - 8	8 - 12	12 - 14
Analyte						
Acidity by pH	7.0 =	NR	NR	NR	NR	NR
Cyanide, Total	NR	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U
Sulfide	NR	0.29 U	0.28 U	0.29 U	0.29 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

NR - analyte was not detected. The minimum detection limit for the sample is reported.

U - data qualifier required.

NR - analysis not requested.

Table D-11
(continued)

2 of 28

Well ID No.	138-PI-0006	138-PI-0007	138-PI-0008	138-PI-0009	138-PI-0010	138-PI-0011
Well ID No.	B3890CP019	B3890CP019	B3890CP019	B3890CP019	B3890CP019	B3890CP010
Well Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 12	12 - 14	0 - 2
Analyte						
Acidity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U
Sulfide	0.28 U	0.28 U	0.28 U	0.27 U	0.30 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

The analyte was not detected. The minimum detection limit for the sample is reported.

No data qualifier required.

Analysis not requested.

Table D-11
(continued)

Sample ID No.	138-PI-0012	138-PI-0014	138-PI-0015	138-PI-0016	138-PI-0017	138-PI-0018
Well ID No.	B3890CP010	B3890CP010	B3890CP010	B3890CP011	B3890CP011	B3890CP011
Sample Depth (ft)	2 - 4	6 - 8	8 - 10	0 - 2	2 - 6	6 - 8
Analyte						
Acidity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U
Sulfide	0.28 U	0.28 U	0.29 U	0.28 U	0.28 U	0.26 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.
- Analysis not requested.

Table D-11

(continued)

Page 4 of 28

Sample ID No.	138-PI-0019	138-PI-0020	138-PI-0021	138-PI-0038	138-PI-0039	138-PI-0040
Borehole ID No.	B3890CP031	B3890CP031	B3890CP031	B3890CP032	B3890CP032	B3890CP032
Sample Depth (ft)	0 - 2	2 - 6	6 - 8	0 - 2	2 - 6	6 - 8
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U
Sulfide	0.28 U	0.28 U	0.27 U	0.28 U	0.29 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 5 of 28

Sample ID No.	138-PI-0041	138-PI-0042	138-PI-0043	138-PI-0044	138-PI-0045	138-PI-0046
Borehole ID No.	B3890CP032	B3890CP032	B3890CP035	B3890CP035	B3890CP035	B3890CP035
Sample Depth (ft)	8 - 10	12 - 14	0 - 2	2 - 7	7 - 9	9 - 11
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.0 U	1.1 U	1.2 U	1.2 U	1.2 U
Sulfide	0.28 U	0.26 U	0.28 U	0.29 U	0.29 U	0.30 U

Concentration Units - mg/kg · milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 6 of 28

Sample ID No.	138-PI-0047	138-PI-0048	138-PI-0049	138-PI-0050	138-PI-0051	138-PI-0063
Borehole ID No.	B3890CP035	B3890CP037	B3890CP037	B3890CP037	B3890CP037	B3890CP028
Sample Depth (ft)	11 - 13	0 - 2	2 - 6	6 - 8	8 - 12	11 - 13
Analyte						
Corrosivity by pH	6.9 =	NR	NR	NR	NR	NR
Cyanide, Total	1.2 U	1.2 U	1.1 U	1.1 U	1.1 U	1.2 U
Sulfide	0.30 U	0.29 U	0.28 U	0.28 U	0.28 U	0.30 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

D-11

Table D-11
(continued)

Page 7 of 28

Sample ID No.	138-PI-0064	138-PI-0065	138-PI-0066	138-PI-0067	138-PI-0068	138-PI-0069
Borehole ID No.	B3890CP014	B3890CP014	B3890CP014	B3890CP014	B3890CP027	B3890CP027
Sample Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 12	0 - 2	2 - 4
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	6.8 =
Cyanide, Total	1.1 U	1.1 U	1.2 U	1.1 U	1.2 U	1.2 U
Sulfide	0.28 U	0.28 U	0.29 U	0.28 U	0.29 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11

(continued)

Page 8 of 28

Sample ID No.	138-PI-0070	138-PI-0071	138-PI-0072	138-PI-0076	138-PI-0077	138-PI-0078
Borehole ID No.	B3890CP027	B3890CP015	B3890CP015	B3890CP007	B3890CP007	B3890CP007
Sample Depth (ft)	4 - 8	0 - 2	2 - 4	0 - 2	2 - 6	6 - 8
Analyte						
Corrosivity by pH	7.0 =	NR	NR	NR	NR	NR
Cyanide, Total	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U	1.1 U
Sulfide	0.29 U	0.28 U	0.29 U	0.28 U	0.29 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 9 of 28

Sample ID No.	138-PI-0079	138-PI-0080	138-PI-0081	138-PI-0082	138-PI-0083	138-PI-0084
Borehole ID No.	B3890CP007	B3890CP008	B3890CP008	B3890CP008	B3890CP008	B3890CP008
Sample Depth (ft)	8 - 12	0 - 2	2 - 6	6 - 8	8 - 10	10 - 12
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U
Sulfide	0.29 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 10 of 28

Sample ID No.	138-PI-0085	138-PI-0086	138-PI-0087	138-PI-0088	138-PI-0089	138-PI-0090
Borehole ID No.	B3890CP008	B3890CP017	B3890CP017	B3890CP017	B3890CP017	B3890CP016
Sample Depth (ft)	10 - 12	0 - 2	2 - 4	6 - 9	9 - 11.1	0 - 2
Analyte						
Corrosivity by pH	6.9 =	NR	NR	NR	NR	NR
Cyanide, Total	NR	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U
Sulfide	NR	0.28 U	0.28 U	0.29 U	0.29 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 11 of 28

Sample ID No.	138-PI-0091	138-PI-0092	138-PI-0093	138-PI-0094	138-PI-0095	138-PI-0099
Borehole ID No.	B3890CP016	B3890CP016	B3890CP016	B3890CP016	B3890CP016	B3890CP017
Sample Depth (ft)	2 - 4	4 - 6	6 - 10	10 - 12	12 - 15	11 - 13
Analyte						
Corrosivity by pH	NR	6.8 =	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	1.2 U
Sulfide	0.27 U	0.28 U	0.29 U	0.29 U	0.29 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 12 of 28

Sample ID No.	138-PI-0100	138-PI-0101	138-PI-0102	138-PI-0103	138-PI-0104	138-PI-0105
Borehole ID No.	B3890CP009	B3890CP009	B3890CP009	B3890CP009	B3890CP009	B3890CP009
Sample Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 12	8 - 12	12 - 14.6
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.1 U	1.1 U	1.1 U	1.2 U	1.2 U
Sulfide	0.28 U	0.29 U	0.29 U	0.28 U	0.29 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

J - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 13 of 28

Sample ID No.	138-PI-0106	138-PI-0107	138-PI-0108	138-PI-0109	138-PI-0110	138-PI-0111
Borehole ID No.	B3890CP009	B3890CP002	B3890CP002	B3890CP002	B3890CP002	B3890CP020
Sample Depth (ft)	14.6 - 19	0 - 2	2 - 6	6 - 8	8 - 10	0 - 2
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.2 U	1.1 U	1.1 U	1.0 U	1.1 U
Sulfide	0.28 U	0.29 U	0.29 U	0.27 U	0.26 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 14 of 28

Sample ID No.	138-PI-0112	138-PI-0113	138-PI-0114	138-PI-0118	138-PI-0119	138-PI-0120
Borehole ID No.	B3890CP020	B3890CP020	B3890CP020	B3890CP012	B3890CP012	B3890CP012
Sample Depth (ft)	2 - 6	6 - 8	10 - 12	0 - 2	2 - 4	4 - 8
<hr/>						
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.1 U	1.1 U	1.1 U	1.0 U	1.1 U
Sulfide	0.27 U	0.28 U	0.27 U	0.28 U	0.25 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 15 of 28

Sample ID No.	138-PI-0121	138-PI-0122	138-PI-0123	138-PI-0124	138-PI-0125	138-PI-0126
Borehole ID No.	B3890CP012	B3890CP004	B3890CP004	B3890CP004	B3890CP004	B3890CP004
Sample Depth (ft)	8 - 9.6	0 - 2	2 - 4	2 - 4	4 - 5.6	6 - 8
Analyte						
Corrosivity by pH	NR	NR	NR	6.9 =	NR	NR
Cyanide, Total	1.1 U	1.1 U	1.1 U	NR	1.1 U	1.1 U
Sulfide	0.28 U	0.27 U	0.28 U	NR	0.28 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 16 of 28

Sample ID No.	138-PI-0127	138-PI-0128	138-PI-0129	138-PI-0130	138-PI-0131	138-PI-0132
Corehole ID No.	B3890CP003	B3890CP003	B3890CP003	B3890CP003	B3890CP003	B3890CP003
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	4 - 6	6 - 8	8 - 10
Analyte						
Corrosivity by pH	NR	NR	NR	6.8 =	NR	NR
Cyanide, Total	1.1 U	1.0 U	1.1 U	NR	1.1 U	1.1 U
Sulfide	0.28 U	0.26 U	0.29 U	NR	0.29 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.
- Analysis not requested.

Table D-11
(continued)

Page 17 of 28

Sample ID No.	138-PI-0133	138-PI-0134	138-PI-0135	138-PI-0136	138-PI-0137	138-PI-0138
Borehole ID No.	B3890CP003	B3890CP003	B3890CP015	B3890CP015	B3890CP015	B3890CP015
Sample Depth (ft)	10 - 12	10 - 12	0 - 2	2 - 6	6 - 8	8 - 12
<hr/>						
Analyte						
Corrosivity by pH	NR	6.9 =	NR	NR	NR	NR
Cyanide, Total	1.1 U	NR	1.0 U	1.2 U	1.1 U	1.1 U
Sulfide	0.28 U	NR	0.26 U	0.29 U	0.28 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11

(continued)

Page 18 of 28

Sample ID No.	138-PI-0142	138-PI-0143	138-PI-0144	138-PI-0145	138-PI-0146	138-PI-0147
Borehole ID No.	83890CP006	83890CP006	83890CP006	83890CP006	83890CP030	83890CP030
Sample Depth (ft)	0 - 2	2 - 6	6 - 8	8 - 12	0 - 2	2 - 4
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.2 U	1.1 U	1.2 U	1.2 U	1.1 U
Sulfide	0.27 U	0.29 U	0.28 U	0.29 U	0.30 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 19 of 28

Sample ID No.	138-PI-0148	138-PI-0149	138-PI-0150	138-PI-0151	138-PI-0152	138-PI-0156
Borehole ID No.	B3890CP030	B3890CP030	B3890CP030	B3890CP022	B3890CP022	B3890CP022
Sample Depth (ft)	4 - 8	4 - 8	8 - 9.1	0 - 2	2 - 6	6 - 8
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U	1.1 U
Sulfide	0.28 U	0.29 U	0.29 U	0.29 U	0.28 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.
 NR - Analysis not requested.

Table D-11
(continued)

Page 20 of 28

Sample ID No.	138-PI-0157	138-PI-0158	138-PI-0159	138-PI-0160	138-PI-0161	138-PI-0162
Corehole ID No.	B3890CP022	B3890CP022	B3890CP022	B3890CP022	B3890CP024	B3890CP024
Sample Depth (ft)	8 - 10	10 - 12	10 - 12	12 - 14.5	0 - 2	2 - 4
Analyte						
Corrosivity by pH	NR	NR	6.8 =	NR	NR	NR
Cyanide, Total	1.3 U	1.1 U	NR	1.1 U	1.1 U	1.1 U
Sulfide	0.32 U	0.28 U	NR	0.27 U	0.29 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.
- Analysis not requested.

Table D-11
(continued)

Page 21 of 28

Sample ID No.	138-PI-0163	138-PI-0164	138-PI-0165	138-PI-0166	138-PI-0167	138-PI-0168
Corehole ID No.	B3890CP024	B3890CP024	B3890CP024	B3890CP024	B3890CP030	B3890CP030
Sample Depth (ft)	4 - 6	6 - 10	10 - 12	10 - 12	9 - 10.7	9 - 10.7
Analyte						
Corrosivity by pH	NR	NR	NR	6.8 =	NR	6.7 =
Cyanide, Total	1.1 U	1.1 U	1.1 U	NR	1.2 U	NR
Sulfide	0.29 U	0.29 U	0.29 U	NR	0.30 U	NR

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.

R - Analysis not requested.

Table D-11
(continued)

Page 22 of 28

Sample ID No.	138-PI-0169	138-PI-0176	138-PI-0177	138-PI-0178	138-PI-0179	138-PI-0180
Corehole ID No.	B3890CP030	B3890CP033	B3890CP033	B3890CP029	B3890CP029	B3890CP029
Sample Depth (ft)	10 - 13.1	0 - 2	2 - 4	0 - 2	0 - 2	2 - 4
Analyte						
Corrosivity by pH	NR	NR	NR	NR	6.8 =	NR
Cyanide, Total	1.2 U	1.1 U	1.2 U	1.3 U	NR	1.1 U
Sulfide	0.30 U	0.28 U	0.29 U	0.32 U	NR	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

NR - The analyte was not detected. The minimum detection limit for the sample is reported.

U - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 23 of 28

Sample ID No.	138-PI-0181	138-PI-0182	138-PI-0183	138-PI-0184	138-PI-0185	138-PI-0186
Borehole ID No.	B3890CP036	B3890CP036	B3890CP036	B3890CP013	B3890CP013	B3890CP021
Sample Depth (ft)	0 - 2	0 - 2	2 - 4	0 - 2	2 - 4	0 - 2
Analyte						
Corrosivity by pH	NR	6.9 =	NR	NR	NR	NR
Cyanide, Total	1.1 U	NR	1.2 U	1.1 U	1.2 U	1.1 U
Sulfide	0.29 U	NR	0.30 U	0.29 U	0.30 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 24 of 28

Sample ID No.	138-PI-0187	138-PI-0194	138-PI-0196	138-PI-0199	138-PI-0202	138-PI-0206
Borehole ID No.	B3890CP021	B3890CP023	Surface	B3890CP034	B3890CP034	B3890CP005
Sample Depth (ft)	2 - 4	2 - 4	Spill	2 - 4	6 - 8	0 - 2
Analyte						
Corrosivity by pH	NR	8.2 =	6.6 =	7.8 =	7.6 =	NR
Cyanide, Total	1.2 U	NR	NR	NR	NR	1.1 U
Sulfide	0.29 U	NR	NR	NR	NR	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 25 of 28

Sample ID No.	138-PI-0207	138-PI-0208	138-PI-0209	138-PI-0210	138-PI-0211	138-PI-0212
Borehole ID No.	B3890CP005	B3890CP005	B3890CP005	B3890CP001	B3890CP001	B3890CP026
Sample Depth (ft)	2 - 6	6 - 8.5	6 - 8.5	0 - 2	2 - 6	0 - 2
Analyte						
Corrosivity by pH	NR	NR	7.0 =	NR	NR	NR
Cyanide, Total	1.2 U	1.2 U	NR	1.1 U	1.1 U	1.1 U
Sulfide	0.29 U	0.29 U	NR	0.28 U	0.27 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-11
(continued)

Page 26 of 28

Sample ID No.	138-PI-0213	138-PI-0214	138-PI-0215	138-PI-0216	138-PI-0217	138-PI-0058
Borehole ID No.	B3890CP026	B3890CP026	B3890CP026	B3890CP025	B3890CP025	B3890CP028
Sample Depth (ft)	2 - 4	2 - 4	4 - 6	0 - 2	2 - 4	0 - 2
Analyte						
Corrosivity by pH	NR	7.7 =	NR	NR	NR	NR
Cyanide, Total	1.1 U	NR	1.2 U	1.2 U	1.2 U	1.1 U
Sulfide	0.28 U	NR	0.29 U	0.29 U	0.29 U	0.27 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

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Table D-11

(continued)

Page 27 of 28

Sample ID No.	138-PI-0059	138-PI-0060	138-PI-0061	138-PI-0062	138-PI-0192	138-PI-0193
Borehole ID No.	B3890CP028	B3890CP028	B3890CP028	B3890CP028	B3890CP023	B3890CP023
Sample Depth (ft)	2 - 4	4 - 6	6 - 8	8 - 11	0 - 2	2 - 4
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	NR
Cyanide, Total	1.1 U	1.2 U	1.6 U	1.1 U	1.1 U	1.1 U
Sulfide	0.28 U	0.29 U	0.39 U	0.28 U	0.27 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

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Table D-11
(continued)

Page 28 of 28

Sample ID No.	138-PI-0195	138-PI-0197	138-PI-0198	138-PI-0200	138-PI-0201
Borehole ID No.	B3890CP023	B3890CP034	B3890CP034	B3890CP034	B3890CP034
Sample Depth (ft)	5 - 8	0 - 2	2 - 4	4 - 6	6 - 8
Analyte					
Corrosivity by pH	NR	NR	NR	NR	NR
Cyanide, Total	1.2 U	1.1 U	1.1 U	1.9 =	1.1 U
Sulfide	0.29 U	0.28 U	0.28 U	0.28 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-12
Metals and Rare Earths, MISS Onsite Soil Samples

Page 1 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-003 B3890C001 4 - 6	138-MSC-005 B3890C001 10 - 12	138-MSC-007 B3890C001-1 4 - 6	138-MSC-008 B3890C003 0 - 2	138-MSC-012 B3890C003-1 10 - 12	138-MSC-021 B3890C002 4 - 6
Analyte						
Aluminum, Total	5410 J	2850 =	4350 J	4700 J	4530 =	2560 R
Antimony, Total	3.8 U	4.3 R	5.6 U	5.2 U	5.6 R	5.62 UJ
Arsenic, Total	3.6 J	0.87 J	16.2 J	7.2 J	1.5 B	5.1 J
Barium, Total	93.9 =	45.1 =	72.3 =	75.4 =	36.4 B	73.4 =
Beryllium, Total	0.42 BJ	0.29 B	0.38 B	0.36 B	0.51 B	0.27 U
Boron, Total	17.3 U	19.6 U	25.4 U	23.8 U	25.5 U	40.0 =
Cadmium, Total	0.69 U	0.78 U	1.0 R	0.95 R	1.0 R	1.07 U
Calcium, Total	3130 J	1500 =	2080 J	13900 J	958 B	216000 =
Cerium, Total	271 =	78.0 =	1070 =	671 =	2210 =	53.6 U
Chromium, Total	66.1 J	122 J	24.3 =	16.0 =	15.7 R	8.0 R
Cobalt, Total	3.6 BJ	3.2 B	3.1 B	3.8 B	1.8 U	269 J
Copper, Total	21.6 J	7.4 R	41.0 =	32.9 =	33.0 R	63.3 J
Dysprosium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Erbium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Europium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Gadolinium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Holmium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Iron, Total	9100 J	4200 R	9570 J	10000 J	7510 R	32700 =
Lanthanum, Total	226 =	79.3 =	897 =	374 =	1400 =	53.6 U
Lead, Total	82.2 J	10.5 J	244 J	399 J	580 J	147 R
Lithium, Total	17.4 =	19.6 U	25.4 U	23.8 U	25.5 U	379 =
Lutetium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Magnesium, Total	1160 =	816 B	938 B	3840 =	741 B	2840 J
Manganese, Total	149 J	83.7 =	146 J	159 J	37.6 =	588 J
Molybdenum, Total	17.3 U	19.6 U	25.4 U	23.8 U	25.5 U	26.8 U
Neodymium, Total	146 =	57.0 =	646 =	299 =	1230 =	53.6 U
Nickel, Total	7.7 =	5.6 B	5.9 B	9.4 B	4.3 B	55.1 J
Potassium, Total	254 B	434 B	399 B	397 B	527 B	1690 =
Praseodymium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Samarium, Total	34.6 U	39.1 U	118 =	57.5 =	215 =	53.6 U
Selenium, Total	0.45 BJ	0.29 UJ	0.69 BJ	0.60 BJ	0.51 UJ	5.10 R
Silver, Total	0.69 U	0.78 UJ	1.0 R	0.95 R	2.5 BJ	1.34 R
Sodium, Total	127 B	186 B	77 B	77.8 B	138 B	28300 J
Tellurium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Terbium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Thallium, Total	0.85 UJ	0.59 UJ	0.83 UJ	0.95 UJ	1.0 UJ	0.97 UJ
Thulium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Vanadium, Total	12.3 J	7.9 B	10.7 B	9.8 B	11.7 B	23.0 =
Ytterbium, Total	34.6 U	39.1 U	50.8 U	47.7 U	51.0 U	53.6 U
Zinc, Total	71.0 J	21.6 R	63.3 J	121 J	23.8 R	102 R

Concentration Units - mg/kg - milligrams per kilogram.

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- = - No data qualifier required.
- R - Unreliable result. Analyte may or may not be present in the sample.
- B - Reported value was less than CRDL but greater than or equal to the IDL.
- J - Analyte present, reported as an estimated value.

Table D-12

(continued)

Page 2 of 12

Sample ID No.	138-MSC-024	138-MSC-028	138-MSC-031	138-MSC-032	138-MSC-038	138-MSC-039
Borehole ID No.	B3890C002	B3890C022	B3890C022-1	B3890C022-1	B3890C022-2	B3890C022-2
Sample Depth (ft)	10 - 12	4 - 6	8 - 10	10 - 12	12 - 12.8	13 - 13.9
Analyte						
Aluminum, Total	8940 R	3320 R	3750 R	8770 R	2220 R	6550 R
Antimony, Total	4.14 UJ	5.47 UJ	4.24 UJ	22.3 J	3.97 UJ	8.3 BJ
Arsenic, Total	2.0 R	8.6 J	1.2 BJ	3.1 J	7.3 J	2.3 J
Barium, Total	23.2 B	104 =	43.1 =	55.6 =	80.8 =	54.0 =
Beryllium, Total	0.39 B	0.261 U	0.34 B	0.48 B	0.189 U	0.47 B
Boron, Total	19.7 U	26.1 U	20.2 U	19.9 U	18.9 U	20.5 U
Cadmium, Total	0.789 U	1.04 U	0.807 U	0.797 U	0.756 U	0.820 U
Calcium, Total	1070 =	160000 =	9400 =	1120 =	104000 =	11900 =
Cerium, Total	533 =	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Chromium, Total	217 =	26.0 R	49.6 R	1510 =	447 =	913 =
Cobalt, Total	7.2 BJ	80.1 J	1.7 BJ	8.7 BJ	23.1 J	4.3 BJ
Copper, Total	7.0 R	224 J	95.3 J	16.2 R	45.3 R	49.5 R
Dysprosium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Erbium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Europium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Gadolinium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Holmium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Iron, Total	7590 =	11000 =	3150 =	8550 =	4810 =	3950 =
Lanthanum, Total	311 =	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Lead, Total	7.84 R	364 R	123 R	19.8 R	168 R	77.5 R
Lithium, Total	19.7 U	445 =	20.2 U	19.9 U	251 =	20.5 U
Lutetium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Magnesium, Total	1040 J	6500 J	238 BJ	1200 J	1450 J	1090 J
Manganese, Total	58.0 J	92.2 J	11.4 J	39.6 R	174 J	65.4 J
Molybdenum, Total	19.7 U	26.1 U	20.2 U	19.9 U	18.9 U	20.5 U
Neodymium, Total	203 =	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Nickel, Total	9.2 =	135 =	2.8 B	12.1 =	41.9 =	6.9 B
Potassium, Total	295 B	1620 =	364 B	458 B	812 B	614 B
Praseodymium, Total	39.4 R	3.40 R	0.44 R	0.435 R	0.412 R	41.0 U
Samarium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Selenium, Total	0.389 R	3.40 J	0.44 R	0.435 R	0.412 R	0.376 R
Silver, Total	1.2 R	1.3 R	1.7 BJ	0.996 R	0.944 R	1.8 BJ
Sodium, Total	97.9 BJ	20600 J	155 BJ	295 BJ	3340 J	720 BJ
Tellurium, Total	39.4 U	52.1 U	106 =	39.8 U	37.8 U	41.0 U
Terbium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Thallium, Total	0.778 UJ	1.15 UJ	0.88 UJ	0.869 UJ	0.824 UJ	0.752 UJ
Thulium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Vanadium, Total	12.0 =	30.6 =	11.0 =	22.7 =	13.0 =	10.2 B
Ytterbium, Total	39.4 U	52.1 U	40.4 U	39.8 U	37.8 U	41.0 U
Zinc, Total	50.5 R	78.8 R	15.8 R	40.2 R	55.7 R	26.7 R

Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-12
(continued)

Page 3 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-043 83890C004 6 - 8	138-MSC-046 83890C004 12 - 14	138-MSC-058 83890C004 15 - 16.5	138-MSC-059 83890C004 16.5 - 17.5	138-MSC-060 83890C004 17.5 - 19.5	138-MSC-061 83890C004 19.5 - 21.5
Analyte						
Aluminum, Total	2090 R	1610 R	1560 =	2300 =	1760 =	1260 =
Antimony, Total	4.62 UJ	4.49 UJ	4.6 UJ	4 U	4.4 U	3.5 U
Arsenic, Total	6.7 J	2.9 J	1.9 BJ	2.3 J	4.0 J	0.72 BJ
Barium, Total	36.7 B	62.4 =	34.4 B	44.0 =	34.6 B	30.8 B
Beryllium, Total	0.53 B	0.45 B	0.29 BJ	0.33 BJ	0.21 BJ	0.34 BJ
Boron, Total	22.0 U	21.4 U	22.6 U	19.5 U	21.5 U	17.2 U
Cadmium, Total	0.88 U	0.86 U	0.72 UJ	0.63 U	0.69 U	0.55 U
Calcium, Total	4220 =	1570 =	1420 =	4820 =	1540 =	1960 =
Cerium, Total	44.0 U	42.8 U	45.1 U	806 =	525 =	235 =
Chromium, Total	17.2 BJ	10.5 R	13.9 J	13.9 J	9.3 J	2.0 J
Cobalt, Total	2.1 R	1.7 BJ	1.1 BJ	1.5 BJ	1.5 BJ	1.0 BJ
Copper, Total	136 J	29.4 BJ	29.7 J	42.2 J	24.0 J	3.0 BJ
Dysprosium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Erbium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Europium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Gadolinium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Holmium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Iron, Total	5380 =	2860 =	2910 =	4750 =	3680 =	2160 =
Lanthanum, Total	44.0 U	42.8 U	45.1 U	451 =	308 =	217 =
Lead, Total	327 R	96.7 R	24.4 J	77.3 J	54.2 J	6.2 J
Lithium, Total	22.0 U	21.4 U	22.6 U	19.5 U	21.5 U	17.2 U
Lutetium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Magnesium, Total	257 BJ	137 BJ	209 B	585 B	458 B	400 B
Manganese, Total	64.9 J	114 J	45.2 =	208 =	109 =	33.4 =
Molybdenum, Total	22.0 U	21.4 U	22.6 U	19.5 U	21.5 U	17.2 U
Neodymium, Total	44.0 U	42.8 U	45.1 U	296 =	191 =	75.6 =
Nickel, Total	3.0 B	4.2 B	3.0 B	2.7 B	3.7 B	3.0 B
Potassium, Total	403 B	411 B	361 B	167 B	208 B	232 B
Praseodymium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Samarium, Total	44.0 U	42.8 U	45.1 U	44.8 =	42.9 U	34.3 U
Selenium, Total	1.3 J	0.51 BJ	0.45 UJ	0.38 BJ	0.30 U	0.47 UJ
Silver, Total	2.0 BJ	1.07 R	2.6 UJ	2.2 U	2.4 U	2.0 U
Sodium, Total	92.3 BJ	56.4 BJ	19 U	145 B	142 B	137 B
Tellurium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Terbium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Thallium, Total	0.968 UJ	0.784 UJ	0.90 UJ	0.75 UJ	0.59 UJ	0.94 UJ
Thulium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Vanadium, Total	6.5 B	3.6 B	0.83 UJ	8.1 BJ	7.1 BJ	4.5 BJ
Ytterbium, Total	44.0 U	42.8 U	45.1 U	39.1 U	42.9 U	34.3 U
Zinc, Total	27.5 R	17.8 R	13.1 J	28.7 J	21.3 J	17.1 J

Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-12

(continued)

Page 4 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-062 B3890C023 0 - 2	138-MSC-067 B3890C023 12 - 14	138-MSC-077 B3890C024 6 - 8	138-MSC-079 B3890C005 0 - 2	138-MSC-082 B3890C005 14 - 16	138-MSC-087 B3890C025 10 - 12
Analyte						
Aluminum, Total	7070 =	5960 =	15600 J	5700 J	4070 J	6880 J
Antimony, Total	5.6 UJ	4.2 U	5.6 UJ	4.1 UJ	4.4 UJ	5.0 UJ
Arsenic, Total	20.8 J	2.1 BJ	235 J	2.6 J	5.9 J	7.7 J
Barium, Total	161 =	26.0 B	13.7 BJ	23.9 BJ	47.0 J	203 J
Beryllium, Total	1.5 J	0.39 BJ	1.7 J	0.30 BJ	0.82 BJ	0.56 BJ
Boron, Total	27.6 U	20.7 U	27.6 U	23.7 =	21.5 U	32.8 =
Cadmium, Total	0.88 U	0.66 U	0.88 UJ	0.64 UJ	0.69 UJ	0.78 UJ
Calcium, Total	37500 =	3500 =	92600 J	4650 J	1850 J	8150 J
Cerium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Chromium, Total	46.0 J	10.2 J	1.0 BJ	13.2 =	8.1 =	21.4 =
Cobalt, Total	3.6 BJ	6.8 BJ	1.3 UJ	8.8 BJ	6.5 BJ	4.1 BJ
Copper, Total	70.8 J	23.3 J	83.2 J	25.9 J	3.3 BJ	110 J
Dysprosium, Total	55.2 U	41.4 U	59.2 =	40.1 U	43.0 U	48.8 U
Erbium, Total	55.2 U	41.4 U	58.1 =	40.1 U	43.0 U	48.8 U
Europium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Gadolinium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Holmium, Total	55.2 U	41.4 U	57.5 =	40.1 U	43.0 U	48.8 U
Iron, Total	6590 =	11900 =	2270 J	12800 J	7870 J	11400 J
Lanthanum, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Lead, Total	127 J	41.8 J	45.6 J	43.5 J	5.6 UJ	66.0 J
Lithium, Total	403 =	20.7 U	729 =	20.0 U	25.3 =	157 =
Lutetium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Magnesium, Total	1620 =	2080 =	1000 BJ	2520 J	1280 J	710 BJ
Manganese, Total	288 =	156 =	91.1 J	193 J	67.2 J	108 J
Molybdenum, Total	27.6 U	20.7 U	27.6 U	20.0 U	21.5 U	24.4 U
Neodymium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Nickel, Total	14.6 =	8.9 =	17.5 J	8.0 BJ	8.2 BJ	13.1 J
Potassium, Total	1140 B	402 B	600 BJ	352 BJ	979 BJ	1150 BJ
Praseodymium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Samarium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Selenium, Total	0.61 UJ	0.41 UJ	0.58 UJ	0.38 UJ	0.46 UJ	0.54 UJ
Silver, Total	3.1 UJ	2.4 UJ	1.2 UJ	2.1 J	1.7 BJ	1.8 BJ
Sodium, Total	409 B	300 B	6120 J	406 BJ	2210 J	1480 J
Tellurium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Terbium, Total	55.2 U	41.4 U	67.7 =	40.1 U	43.0 U	48.8 U
Thallium, Total	1.2 UJ	0.82 UJ	11.6 UJ	0.76 UJ	0.92 UJ	10.7 UJ
Thulium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Vanadium, Total	10.0 BJ	19.7 J	4.2 BJ	14.4 J	7.4 BJ	6.2 BJ
Ytterbium, Total	55.2 U	41.4 U	55.1 U	40.1 U	43.0 U	48.8 U
Zinc, Total	147 J	48.1 J	59.4 J	35.0 J	24.2 =	53.1 J

Concentration Units - mg/kg - milligrams per kilogram.

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= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to sufficient contact concentration.

Table D-12
(continued)

Page 5 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-093 B3890C031 10 - 12	138-MSC-098 B3890C030 4 - 6	138-MSC-105 B3890C021 6 - 8	138-MSC-106 B3890C021 10 - 12	138-MSC-113 B3890C021 10 - 12
Analyte					
Aluminum, Total	12100 J	8760 J	55700 J	8580 J	26600 J
Antimony, Total	5.4 UJ	3.8 UJ	10.3 B	3.2 UJ	7.6 UJ
Arsenic, Total	1060 J	7.4 J	1.5 BJ	1.3 BJ	15.2 J
Barium, Total	49.9 BJ	55.0 J	101 J	39.4 J	209 J
Beryllium, Total	0.53 BJ	0.71 BJ	3.2 J	0.67 BJ	5.3 J
Boron, Total	28.5 =	18.6 U	33.8 U	15.9 U	114 =
Cadmium, Total	0.85 UJ	0.59 UJ	1.1 UJ	0.51 UJ	1.2 UJ
Calcium, Total	38300 J	6400 J	108000 J	1880 J	21500 J
Cerium, Total	53.2 U	68.1 =	67.6 U	31.8 U	74.8 U
Chromium, Total	13.9 J	6.9 J	0.98 UJ	7.6 =	18.2 =
Cobalt, Total	3.4 BJ	5.8 BJ	1.6 UJ	8.1 J	1.8 UJ
Copper, Total	50.7 J	72.2 J	122 J	6.5 J	104 J
Dysprosium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Erbium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Europium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Gadolinium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Holmium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Iron, Total	16900 J	11700 J	7800 J	12400 J	4850 J
Lanthanum, Total	72.0 =	40.3 =	67.6 U	31.8 U	74.8 U
Lead, Total	315 J	139 J	85.0 J	18.0 J	205 J
Lithium, Total	136 =	240 =	2290 =	70.1 =	1300 =
Lutetium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Magnesium, Total	1000 BJ	1380 J	794 BJ	2350 J	4310 J
Manganese, Total	294 J	266 J	123 J	82.3 J	242 J
Molybdenum, Total	26.6 U	18.6 U	33.8 U	15.9 U	37.4 U
Neodymium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Nickel, Total	14.4 J	12.0 J	7.4 BJ	14.9 J	65.4 J
Potassium, Total	249 BJ	491 BJ	276 UJ	1110 J	687 BJ
Praseodymium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Samarium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Selenium, Total	0.51 UJ	0.40 UJ	7.3 UJ	0.37 UJ	0.62 UJ
Silver, Total	2.4 BJ	1.7 BJ	1.5 UJ	1.8 J	1.7 UJ
Sodium, Total	3210 J	522 BJ	371 BJ	66.8 BJ	3050 J
Tellurium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Terbium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Thallium, Total	10.2 UJ	0.79 UJ	14.7 UJ	0.75 UJ	1.2 UJ
Thulium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Vanadium, Total	0.98 UJ	7.7 BJ	1.8 BJ	7.2 BJ	4.8 B
Ytterbium, Total	53.2 U	37.2 U	67.6 U	31.8 U	74.8 U
Zinc, Total	70.5 J	66.8 J	134 J	32.3 J	51.3 J

Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

UJ - Analyte present; reported as an estimated value but must be estimated due to quality control considerations.

Table D-12

(continued)

Page 6 of 12

Sample ID No.	138-MSC-122	138-MSC-125	138-MSC-127	138-MSC-142	138-MSC-145	138-MSC-150
Borehole ID No.	B3890C033	B3890C027	B3890C027	B3890C032	B3890C010	B3890C028
Sample Depth (ft)	5 - 7	4 - 6	8 - 10	4 - 6	6 - 8	8 - 11
Analyte						
Aluminum, Total	6240 J	5190 =	7230 J	6460 J	5982 J	3550 R
Antimony, Total	4.0 UJ	3.7 U	3.2 UJ	3.8 UJ	3.2 UJ	3.0 J
Arsenic, Total	1.2 BJ	6.2 B	4.3 J	1.9 J	0.96 BJ	3.8 BJ
Barium, Total	32.5 BJ	61.0 B	63.6 J	77.5 J	24.6 BJ	159 J
Beryllium, Total	0.46 BJ	0.33 B	0.32 BJ	0.51 BJ	0.46 BJ	0.30 BJ
Boron, Total	19.9 U	18.3 U	15.9 U	19.0 U	16.2 U	15.2 U
Cadmium, Total	0.60 UJ	0.55 U	2.3 J	0.57 UJ	0.48 UJ	0.46 UJ
Calcium, Total	1880 J	507 B	612 BJ	3190 J	561 BJ	2130 J
Cerium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Chromium, Total	47.1 J	12.4 =	9.3 J	45.7 J	15.8 J	16.4 J
Cobalt, Total	5.5 BJ	4.1 B	15.0 J	5.8 BJ	3.0 BJ	3.9 BJ
Copper, Total	6.7 R	29.6 =	126 J	24.2 J	13.2 J	17.1 R
Dysprosium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Erbium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Europium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Gadolinium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Holmium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Iron, Total	9410 J	6300 =	7430 J	10200 J	7300 J	6840 R
Lanthanum, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Lead, Total	18.7 J	8.2 J	3.3 =	30.8 J	4.8 =	60.7 J
Lithium, Total	40.4 =	22.6 =	15.9 U	87.7 =	49.4 =	15.2 U
Lutetium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Magnesium, Total	973 BJ	688 B	1170 J	1520 J	907 J	779 J
Manganese, Total	335 J	59.3 =	36.4 R	146 J	44.4 R	113 J
Molybdenum, Total	19.9 U	18.3 U	15.9 U	19.0 U	16.2 U	15.2 U
Neodymium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Nickel, Total	6.8 BJ	7.9 =	24.9 J	6.6 BJ	7.4 J	6.5 J
Potassium, Total	632 BJ	240 B	439 BJ	289 BJ	319 BJ	478 BJ
Praseodymium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Samarium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Selenium, Total	0.4 UJ	0.37 UJ	0.35 UJ	0.33 UJ	0.37 UJ	0.38 UJ
Silver, Total	1.4 B	1.4 B	0.99 B	1.5 B	1.4 B	1.2 B
Sodium, Total	101 BJ	39.2 B	33.3 BJ	314 BJ	43.7 BJ	109 BJ
Tellurium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Terbium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Thallium, Total	0.80 UJ	0.74 UJ	0.70 UJ	0.66 UJ	0.75 UJ	0.75 UJ
Thulium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Vanadium, Total	7.0 BJ	8.6 B	4.3 BJ	12.8 J	8.8 J	5.7 BJ
Ytterbium, Total	39.7 U	36.7 U	31.8 U	38.0 U	32.4 U	30.5 U
Zinc, Total	14.9 R	21.7 =	57.3 J	36.4 J	182 J	67.8 J

Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

Table D-12

(continued)

Page 7 of 12

Sample ID No.	138-MSC-167	138-MSC-171	138-MSC-178	138-MSC-180	138-MSC-183	138-MSC-184
Borehole ID No.	B3890C017	B3890C018	B3890C014	B3890C026	B3890C026	B3890C012
Sample Depth (ft)	12 - 14	4 - 6	12 - 14	0 - 2	12 - 14	14 - 16
Analyte						
Aluminum, Total	2810 J	5060 J	2400 J	24900 J	3950 J	2310 J
Antimony, Total	4.1 U	3.5 U	3.9 U	30.3 J	4.3 U	3.4 U
Arsenic, Total	1.1 BJ	0.88 BJ	2.8 J	11.9 J	1.1 BJ	1.1 BJ
Barium, Total	54.1 J	18.2 BJ	52.4 J	310 J	52.0 J	26.8 BJ
Beryllium, Total	0.39 B	0.28 B	0.28 B	2.6 J	0.29 B	0.31 B
Boron, Total	20.2 U	17.6 U	19.3 U	31.2 UJ	20.9 U	16.5 U
Cadmium, Total	0.65 U	0.55 U	0.62 U	1.0 UJ	0.67 U	0.53 U
Calcium, Total	10800 J	747 BJ	1120 J	104000 J	2980 J	1340 J
Cerium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Chromium, Total	26.7 R	41.3 R	4.2 R	1450 R	10.6 R	5.4 R
Cobalt, Total	4.3 B	2.9 B	3.0 B	3.1 BJ	3.2 B	3.8 B
Copper, Total	6.7 =	4.7 =	4.1 B	173 J	10.8 =	3.7 B
Dysprosium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Erbium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Europium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Gadolinium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Holmium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Iron, Total	7390 J	7340 J	3930 J	4990 J	7420 J	6020 J
Lanthanum, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Lead, Total	10.3 J	8.1 J	44.7 J	56.3 J	6.4 J	4.3 J
Lithium, Total	20.2 U	17.6 U	19.3 U	2030 =	37.8 =	16.5 U
Lutetium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Magnesium, Total	1200 J	772 BJ	553 BJ	2740 J	1050 J	699 BJ
Manganese, Total	450 J	48.1 J	34.6 J	415 J	54.3 J	40.8 J
Molybdenum, Total	20.2 U	17.6 U	19.3 U	31.2 U	20.9 U	16.5 U
Neodymium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Nickel, Total	6.7 B	4.9 B	4.4 B	83.7 J	7.4 B	6.1 B
Potassium, Total	1220 =	144 U	751 B	302 BJ	272 B	760 B
Praseodymium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Samarium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Selenium, Total	0.38 UJ	0.36 UJ	0.38 UJ	0.86 UJ	0.58 UJ	0.30 UJ
Silver, Total	2.3 U	1.9 U	2.2 U	3.6 UJ	2.4 U	1.9 U
Sodium, Total	404 B	73.2 B	386 B	2400 J	493 B	51.4 B
Tellurium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Terbium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Thallium, Total	0.77 R	0.70 R	0.77 R	1.7 R	11.6 R	0.61 R
Thulium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Vanadium, Total	6.1 B	7.0 B	3.3 B	13.8 BJ	5.9 B	5.7 B
Ytterbium, Total	40.4 U	35.2 U	38.7 U	62.4 U	41.8 U	32.9 U
Zinc, Total	18.3 R	15.9 R	10.6 R	491 J	42.9 =	14.8 R

Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

NR - Analysis not requested.

Table D-12

(continued)

Page 8 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-196 B3890C016 14 - 16	138-MSC-202 B3890C009 8 - 10	138-MSC-208 B3890C011 12 - 14	138-MSC-215 B3890C029 12 - 14	138-MSC-223 B3890C001-2 4 - 6	138-MSC-224 B3890C001-2 10 - 12
Analyte						
Aluminum, Total	3770 J	4620 J	2040 J	8390 J	5130 J	2920 J
Antimony, Total	4.7 U	4.2 U	4.1 U	23.0 =	14.2 J	3.3 UJ
Arsenic, Total	1.1 BJ	3.5 J	1.2 BJ	1.6 BJ	2.4 J	4.3 J
Barium, Total	52.9 J	47.2 J	44.4 J	165 J	28.9 BJ	29.1 BJ
Beryllium, Total	0.16 B	0.49 B	0.10 B	0.79 B	0.25 BJ	0.35 BJ
Boron, Total	22.8 U	20.6 U	19.9 U	27.4 U	17.7 U	16.5 U
Cadmium, Total	0.73 U	0.66 U	0.64 U	0.88 U	0.53 UJ	0.49 UJ
Calcium, Total	5050 J	5470 J	959 BJ	14200 J	1710 =	2280 J
Cerium, Total	52.6 =	41.2 U	39.8 U	70.0 =	190 =	94.2 =
Chromium, Total	6.6 J	7.7 J	4.0 J	1210 J	919 =	115 =
Cobalt, Total	3.5 B	4.7 B	2.9 B	2.2 B	3.6 BJ	5.4 BJ
Copper, Total	8.7 =	15.0 =	7.9 =	63.8 =	34.4 J	24.5 J
Dysprosium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Erbium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Europium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Gadolinium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Holmium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Iron, Total	6650 J	7670 J	3920 J	3980 J	7330 J	8250 J
Lanthanum, Total	45.7 U	41.2 U	39.8 U	54.7 U	277 =	70.2 =
Lead, Total	3.3 J	34.3 J	8.3 BJ	144 J	39.7 J	15.1 J
Lithium, Total	22.8 U	32.0 =	19.9 U	200 =	17.7 U	16.5 U
Lutetium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Magnesium, Total	1410 J	1040 J	594 BJ	728 BJ	930 J	789 BJ
Manganese, Total	63.2 J	73.8 J	64.0 J	84.2 J	62.6 =	139 J
Molybdenum, Total	22.8 U	20.6 U	19.9 U	27.4 U	17.7 U	16.5 U
Neodymium, Total	45.7 U	41.2 U	39.8 U	54.7 U	171 =	53.7 =
Nickel, Total	7.6 B	9.8 =	5.4 B	12.2 =	7.4 =	9.2 =
Potassium, Total	428 B	590 B	162 U	349 B	330 BJ	511 BJ
Praseodymium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Samarium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Selenium, Total	0.42 UJ	0.41 UJ	0.39 UJ	0.48 UJ	0.38 UJ	0.40 UJ
Silver, Total	2.6 U	2.1 U	2.0 U	2.7 U	0.88 J	0.84 J
Sodium, Total	129 B	359 B	103 B	1050 B	47.1 BJ	257 BJ
Tellurium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Terbium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Thallium, Total	0.83 R	0.82 R	0.78 R	0.95 R	0.76 UJ	0.79 UJ
Thulium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Vanadium, Total	53 B	12.2 =	3.7 B	9.1 B	9.6 J	6.6 BJ
Ytterbium, Total	45.7 U	41.2 U	39.8 U	54.7 U	35.4 U	33.0 U
Zinc, Total	23.2 R	31.5 =	195 =	39.3 =	82.1 =	30.8 =

Concentration Units - mg/kg - milligrams per kilogram.

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= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

Table D-12
(continued)

Page 9 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-231 B3890C003-2 0 - 2	138-MSC-239 B3890C003-2 15 - 17.5	138-MSC-243 B3890C034 6 - 8	138-MSC-272 B3890C013 12 - 14	138-MSC-274 B3890C008-1 0 - 2	138-MSC-280 B3890C020 0 - 2
Analyte						
Aluminum, Total	4130 J	3530 J	3230 J	3450 =	5040 =	2880 =
Antimony, Total	4.5 UJ	4.1 UJ	3.6 UJ	3.82 U	3.89 U	4.13 U
Arsenic, Total	9.3 J	1.6 BJ	2.0 BJ	1.5 B	2.3 =	1.6 B
Barium, Total	56.3 J	71.6 J	18.9 BJ	90.3 =	53.6 =	33.0 B
Beryllium, Total	0.38 BJ	0.50 B	0.20 BJ	0.290 B	0.45 B	0.28 B
Boron, Total	22.3 U	20.6 U	18.2 U	19.1 U	19.4 U	19.7 U
Cadmium, Total	1.2 =	0.89 BJ	0.55 UJ	0.574 U	0.97 B	0.787 U
Calcium, Total	10100 J	12000 J	770 BJ	1710 =	7440 =	3130 =
Cerium, Total	486 =	41.3 U	36.4 U	38.2 U	38.9 U	186 =
Chromium, Total	12.9 J	34.7 =	1.3 B	5.0 R	4.3 R	53.0 =
Cobalt, Total	3.5 BJ	5.6 BJ	4.3 BJ	3.1 B	1.9 B	2.5 B
Copper, Total	37.6 J	27.7 J	36.2 J	7.2 =	15.2 =	22.9 =
Dysprosium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Erbium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Europium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Gadolinium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Holmium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Iron, Total	7540 J	7040 J	13700 J	6120 =	4140 =	5320 =
Lanthanum, Total	274 =	41.3 U	36.4 U	38.2 U	38.9 U	112 =
Lead, Total	329 =	92.0 J	6.7 BJ	9.4 =	36.3 J	37.6 =
Lithium, Total	22.3 U	20.6 U	39.7 =	19.1 U	85.8 =	19.7 U
Lutetium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Magnesium, Total	1500 J	1100 J	414 BJ	957 J	933 B	936 B
Manganese, Total	142 J	226 J	74.6 J	29.4 =	67.1 J	196 J
Molybdenum, Total	22.3 U	20.6 U	18.2 U	19.1 U	19.4 U	19.7 U
Neodymium, Total	195 =	41.3 U	36.4 U	38.2 U	38.9 U	62.0 =
Nickel, Total	7.8 BJ	21.2 =	8.5 =	5.3 B	6.9 B	6.9 B
Potassium, Total	261 BJ	537 BJ	148 UJ	1010 =	556 B	391 B
Praseodymium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Samarium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Selenium, Total	0.62 BJ	0.41 UJ	0.43 UJ	0.388 UJ	0.417 UJ	0.371 UJ
Silver, Total	1.1 UJ	1.5 B	0.91 UJ	2.5 =	1.3 B	1.9 B
Sodium, Total	163 BJ	390 BJ	32.6 BJ	141 B	1210 =	189 B
Tellurium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Terbium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Thallium, Total	8.9 UJ	8.2 UJ	0.86 UJ	0.776 U	0.833 U	0.742 UJ
Thulium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Vanadium, Total	11.6 J	8.4 BJ	5.7 BJ	14.4 =	9.7 U	9.8 =
Ytterbium, Total	44.5 U	41.3 U	36.4 U	38.2 U	38.9 U	39.4 U
Zinc, Total	120 J	30.4 J	38.2 =	17.6 R	24.1 R	29.1 =

Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

UN - Analyte not reported.

Table D-12

(continued)

Page 10 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-284 B3890C020 8 - 10	138-MSC-289 B3890C019 6 - 8	138-MSC-291 B3890C008-1 14 - 16	138-MSC-308 B3890C006-2 6 - 8	138-MSC-314 B3890C022-3 14 - 16	138-MSC-320 B3890C015-1 12 - 14
Analyte						
Aluminum, Total	4300 =	5280 =	3530 =	12900 =	6730 =	3920 =
Antimony, Total	3.38 U	3.53 U	3.61 U	3.8 UJ	9.7 B	3.99 U
Arsenic, Total	1.2 B	0.84 B	0.870 B	32.1 J	3.4 BJ	0.96 B
Barium, Total	29.0 B	8.7 B	104 =	38.2 =	51.9 J	88.7 =
Beryllium, Total	0.200 B	0.21 B	0.22 B	1.5 =	0.90 B	0.22 B
Boron, Total	16.9 U	17.7 U	18.1 U	17.4 U	21.9 U	20.0 U
Cadmium, Total	0.506 U	0.53 U	0.542 U	0.70 U	0.66 U	0.599 U
Calcium, Total	883 =	23700 =	2620 =	28900 =	7750 =	2320 =
Cerium, Total	33.8 U	35.3 U	36.1 U	34.9 U	3140 =	39.9 U
Chromium, Total	5.8 R	3.2 R	5.6 R	256 J	1300 =	5.5 R
Cobalt, Total	1.9 B	0.883 U	3.9 B	8.4 B	5.0 B	3.5 B
Copper, Total	6.0 =	11.2 =	7.0 =	144 J	36.1 =	8.2 =
Dysprosium, Total	33.8 U	35.3 U	36.1 U	34.9 U	52.0 =	39.9 U
Erbium, Total	33.8 U	35.3 U	36.1 U	34.9 U	43.8 U	39.9 U
Europium, Total	33.8 U	35.3 U	36.1 U	34.9 U	43.8 U	39.9 U
Gadolinium, Total	33.8 U	35.3 U	36.1 U	34.9 U	129 =	39.9 U
Holmium, Total	33.8 U	35.3 U	36.1 U	34.9 U	43.8 U	39.9 U
Iron, Total	6520 =	381 =	6480 =	35400 R	5950 =	7810 =
Lanthanum, Total	33.8 U	35.3 U	36.1 U	34.9 U	1560 =	39.9 U
Lead, Total	3.9 =	44.0 =	3.3 =	124 J	67.4 J	2.2 =
Lithium, Total	17.8 =	95.4 =	20.0 =	867 =	21.9 U	25.7 =
Lutetium, Total	33.8 U	35.3 U	36.1 U	34.9 U	43.8 U	39.9 U
Magnesium, Total	1050 =	888 =	1120 =	2190 J	1060 B	1310 =
Manganese, Total	26.9 J	25.7 J	32.8 J	268 =	82.9 =	37.9 J
Molybdenum, Total	16.9 U	17.7 U	18.1 U	17.4 U	21.9 U	20.0 U
Neodymium, Total	33.8 U	35.3 U	36.1 U	34.9 U	1310 =	39.9 U
Nickel, Total	5.2 B	3.1 B	5.0 B	19.9 =	6.0 B	6.8 B
Potassium, Total	369 B	883 B	574 B	531 B	752 B	686 B
Praseodymium, Total	33.8 U	35.3 U	36.1 U	34.9 U	372 =	39.9 U
Samarium, Total	33.8 U	35.3 U	36.1 U	34.9 U	316 =	39.9 U
Selenium, Total	0.431 UJ	0.601 UJ	0.329 UJ	3.7 U	1.0 J	0.324 UJ
Silver, Total	1.2 B	0.883 U	2.0 J	2.5 J	6.0 R	2.7 =
Sodium, Total	117 B	1620 =	139 B	1130 =	896 B	145 B
Tellurium, Total	33.8 U	35.3 U	36.1 U	34.9 U	43.8 U	39.9 U
Terbium, Total	33.8 U	35.3 U	36.1 U	34.9 U	43.8 U	39.9 U
Thallium, Total	0.862 UJ	1.2 UJ	0.657 U	7.4 UJ	8.0 UJ	0.648 UJ
Thulium, Total	33.8 U	35.3 U	36.1 U	34.9 U	43.8 U	39.9 U
Vanadium, Total	10.4 =	8.8 U	10.7 =	1.0 U	17.4 =	11.6 =
Ytterbium, Total	33.8 U	35.3 U	36.1 U	34.9 U	43.8 U	39.9 U
Zinc, Total	12.8 R	9.5 R	17.5 R	74.8 =	40.1 =	20.8 R

Concentration Units - mg/kg - milligrams per kilogram.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- = - No data qualifier required.
- R - Unreliable result. Analyte may or may not be present in the sample.
- B - Reported value was less than CRDL but greater than or equal to the IDL.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- NR - Analysis not requested.

Table D-12

(continued)

Page 11 of 12

Sample ID No.	138-MSC-324	138-MSC-329	138-MSC-330	138-MSC-334	138-MSC-336	138-MSC-338
Borehole ID No.	83890C028-1	83890C024-2	83890C024-2	83890C030-12	83890C030-2	83890C010-1
Sample Depth (ft)	6 - 8	6 - 8	10 - 14	4 - 6	10 - 14	0 - 2
Analyte						
Aluminum, Total	6070 =	10000 =	4290 =	35900 =	5070 =	2730 =
Antimony, Total	3.97 U	6 U	4.5 =	5.0 U	4.3 UJ	13.6 B
Arsenic, Total	2.5 =	149 J	17.6 J	80.5 J	20.1 J	8.1 J
Barium, Total	64.2 =	15.3 B	52.9 =	135 =	34.5 B	59.9 =
Beryllium, Total	0.54 B	0.86 B	0.64 U	1.7 =	0.46 B	0.50 B
Boron, Total	19.8 U	29.5 U	21.9 U	24.7 U	21.1 U	23.4 U
Cadmium, Total	0.595 U	0.94 U	0.7 U	1.4 =	0.68 U	0.75 U
Calcium, Total	2780 =	46200 =	2900 =	44600 =	5010 =	4310 =
Cerium, Total	39.7 U	58.9 U	43.9 U	246 =	42.3 U	46.8 U
Chromium, Total	45.0 =	0.85 U	7.4 =	14.3 =	17.4 =	1100 =
Cobalt, Total	6.1 B	1.4 U	4.1 B	3.3 B	4.9 B	3.9 B
Copper, Total	30.8 =	51.1 =	7.8 =	92.8 =	9.8 =	156 =
Dysprosium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Erbium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Europium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Gadolinium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Holmium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Iron, Total	10300 =	3290 =	6720 =	7100 =	8620 =	11600 =
Lanthanum, Total	39.7 U	58.9 U	43.9 U	136 =	42.3 U	46.8 U
Lead, Total	149 =	30.7 J	4.8 J	70.4 J	13.7 J	176 J
Lithium, Total	19.8 U	497 =	31.3 =	792 =	55.7 =	25.3 =
Lutetium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Magnesium, Total	1340 =	733 B	1460 =	2500 =	1360 =	818 B
Manganese, Total	341 J	51.8 =	59.7 =	417 =	69.1 =	139 =
Molybdenum, Total	19.8 U	29.5 U	21.9 U	24.7 U	21.1 U	23.4 U
Neodymium, Total	39.7 U	58.9 U	43.9 U	87.5 =	42.3 U	46.8 U
Nickel, Total	10.5 =	14.1 =	83 B	32.9 =	9.0 =	8.6 B
Potassium, Total	642 B	575 B	765 B	560 B	450 B	196 B
Praseodymium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Samarium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Selenium, Total	0.396 UJ	0.61 J	1.3 =	0.49 J	0.57 J	1.2 =
Silver, Total	2.8 =	3.4 U	2.5 U	2.8 U	2.4 U	2.6 U
Sodium, Total	190 B	5410 =	267 B	1780 =	481 B	186 B
Tellurium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Terbium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Thallium, Total	0.791 UJ	11.7 UJ	0.86 UJ	9.9 UJ	0.82 UJ	9.4 UJ
Thulium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Vanadium, Total	13.7 =	10.5 B	14.5 =	14.0 =	14.8 =	15.0 =
Ytterbium, Total	39.7 U	58.9 U	43.9 U	49.3 U	42.3 U	46.8 U
Zinc, Total	174 =	33.9 =	20.5 =	85.3 =	25.4 =	95.2 =

Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

Table D-12

(continued)

Page 12 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-339 B3890C010-1 4 - 8	138-MSC-074 B3890C007 14 - 16	138-MSC-078 B3890C024 10 - 12	138-MSC-094 B3890C031 12 - 14	138-MSC-100 B3890C030 10 - 12
Analyte					
Aluminum, Total	5270 =	6150 J	4650 J	3160 J	4420 J
Antimony, Total	4.2 U	3.5 UJ	3.3 J	4.6 BJ	4.2 UJ
Arsenic, Total	0.52 BJ	5.0 J	7.5 J	4.3 J	5.5 J
Barium, Total	31.0 B	35.8 J	39.6 J	35.2 BJ	22.8 BJ
Beryllium, Total	0.31 B	0.40 BJ	0.43 BJ	0.28 BJ	0.29 BJ
Boron, Total	20.8 U	17.4 U	16.0 U	18.4 U	20.8 U
Cadmium, Total	0.67 U	0.56 UJ	0.51 UJ	0.59 UJ	0.66 UJ
Calcium, Total	570 B	1730 J	4160 J	1460 J	1470 J
Cerium, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Chromium, Total	15.7 =	29.5 J	6.3 J	258 J	5.5 J
Cobalt, Total	2.9 B	2.1 BJ	3.1 BJ	3.4 BJ	3.4 BJ
Copper, Total	20.7 =	6.0 J	7.0 J	13.4 J	4.6 BJ
Dysprosium, Total	41.6 U	34.8 U	32.1 U	36.7 U	55.0 =
Erbium, Total	41.6 U	34.8 U	32.1 U	36.7 U	46.2 =
Europium, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Gadolinium, Total	41.6 U	34.8 U	32.1 U	36.7 U	56.7 =
Holmium, Total	41.6 U	34.8 U	32.1 U	36.7 U	58.7 =
Iron, Total	8110 =	5120 J	6570 J	5520 J	6130 J
Lanthanum, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Lead, Total	31.7 J	19.6 J	5.7 J	2.2 BJ	3.2 J
Lithium, Total	49.4 =	20.2 =	23.8 =	18.4 U	39.1 =
Lutetium, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Magnesium, Total	862 B	665 BJ	1030 J	638 BJ	901 BJ
Manganese, Total	104 =	29.0 J	36.5 J	35.3 J	38.9 J
Molybdenum, Total	20.8 U	18.4 U	16.0 U	18.4 U	20.8 U
Neodymium, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Nickel, Total	5.7 B	4.8 BJ	6.0 BJ	4.6 BJ	6.3 BJ
Potassium, Total	224 B	407 BJ	567 BJ	245 BJ	253 BJ
Praseodymium, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Samarium, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Selenium, Total	0.41 J	0.35 UJ	0.31 UJ	0.48 UJ	0.40 UJ
Silver, Total	2.4 U	2.0 UJ	1.8 UJ	2.1 UJ	2.4 UJ
Sodium, Total	152 B	98.2 BJ	184 BJ	123 BJ	58.1 BJ
Tellurium, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Terbium, Total	41.6 U	34.8 U	32.1 U	36.7 U	41.5 U
Thallium, Total	0.83 UJ	0.69 UJ	6.1 UJ	0.96 UJ	0.79 UJ
Thulium, Total	41.6 U	34.8 U	32.1 U	36.7 U	51.0 =
Vanadium, Total	14.1 =	6.0 BJ	10.0 J	4.6 BJ	5.9 BJ
Ytterbium, Total	41.6 U	34.8 U	32.1 U	36.7 U	68.6 =
Zinc, Total	126 =	14.0 J	15.2 J	22.9 J	12.1 J

Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than CRDL but greater than or equal to the IDL.

J - Analyte present; reported as an estimated value.

Table D-13
Volatile Organic Compounds, MISS Onsite Soil Samples

Page 1 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-001 B3890C001 0 - 2	138-MSC-003 B3890C001 4 - 6	138-MSC-004 B3890C001 6 - 8	138-MSC-005 B3890C001 10 - 12	138-MSC-006 B3890C001 0 - 10	138-MSC-007 B3890C001-1 4 - 6
Analyte						
1,1,1-TRICHLOROETHANE	6 UJ	3 J	6 U	6 UJ	6 U	6 U
1,1,2,2-TETRACHLOROETHANE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
1,1,2-TRICHLOROETHANE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
1,1-DICHLOROETHANE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
1,1-DICHLOROETHYLENE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
1,2-DICHLOROETHANE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
1,2-DICHLOROETHENE (TOTAL)	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
1,2-DICHLOROPROPANE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
2-BUTANONE	11 UJ	11 UJ	11 U	11 UJ	12 U	9 J
2-CHLOROETHYL VINYLETHER	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
2-HEXANONE	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
4-METHYL-2-PENTANONE	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
ACETONE	57 UJ	75 UJ	34 UJ	20 UJ	56 UJ	74 UJ
ACROLEIN	11 UJ	11 UJ	11 U	11 UJ	12 U	8 J
ACRYLONITRILE	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
BENZENE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
BROMODICHLOROMETHANE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
BROMOFORM	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
BROMOMETHANE	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
CARBON DISULFIDE	13 J	2 J	6 U	6 UJ	2 J	2 J
CARBON TETRACHLORIDE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
CHLOROBENZENE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
CHLOROETHANE	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
CHLOROFORM	6 UJ	1 UJ	6 U	6 UJ	6 U	6 U
CHLOROMETHANE	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
CIS-1,3-DICHLOROPROPENE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
DIBROMOCHLOROMETHANE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
ETHYLBENZENE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
METHYLENE CHLORIDE	85 UJ	110 UJ	130 UJ	70 UJ	45 UJ	32 UJ
STYRENE	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 UJ
TETRACHLOROETHYLENE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
TOLUENE	8 UJ	12 J	2 J	6 UJ	4 J	5 J
TRANS-1,3-DICHLOROPROPENE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
TRICHLOROETHYLENE	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U
VINYL ACETATE	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
VINYL CHLORIDE	11 UJ	11 UJ	11 U	11 UJ	12 U	12 U
XYLENES (TOTAL)	6 UJ	6 UJ	6 U	6 UJ	6 U	6 U

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

B - The analyte was found in the associated blank as well as in the sample.

R - Unreliable result. Analyte may or may not be present in the sample.

J - Analyte present; reported as an estimated value.

JJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-13

(continued)

Sample ID No.	138-MSC-008	138-MSC-009	138-MSC-010	138-MSC-012	138-MSC-021	138-MSC-024
Borehole ID No.	B3890C003	B3890C003	B3890C003	B3890C003-1	B3890C002	B3890C002
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	10 - 12	4 - 6	10 - 12
Analyte						
,1,1-TRICHLOROETHANE	6	U	6	U	6	UJ
,1,2,2-TETRACHLOROETHANE	6	U	6	U	6	UJ
,1,2-TRICHLOROETHANE	6	U	6	U	6	UJ
,1-DICHLOROETHANE	6	U	6	U	6	UJ
,1-DICHLOROETHYLENE	6	U	6	U	6	UJ
,2-DICHLOROETHANE	6	U	6	U	6	UJ
,2-DICHLOROETHENE (TOTAL)	6	U	6	U	6	UJ
,2-DICHLOROPROPANE	6	U	6	U	6	UJ
-BUTANONE	12	R	11	U	11	UJ
-CHLOROETHYLVINYLETHER	12	U	11	U	11	UJ
-HEXANONE	12	U	11	U	11	UJ
-METHYL-2-PENTANONE	12	U	11	U	11	UJ
CETONE	58	UJ	27	UJ	50	UJ
CROLEIN	12	U	11	U	11	UJ
CRYLONITRILE	12	U	11	U	11	UJ
ENZENE	6	U	6	U	6	UJ
ROMODICHLOROMETHANE	6	U	6	U	6	UJ
ROMOFORM	6	U	6	U	6	UJ
ROMOMETHANE	12	U	11	U	11	UJ
ARBON DISULFIDE	6	U	1	J	1	J
ARBON TETRACHLORIDE	6	U	6	U	6	UJ
HLOROBENZENE	6	U	6	U	6	UJ
HLOROETHANE	12	U	11	U	11	UJ
HLOROFORM	6	U	6	U	6	UJ
HLORMETHANE	12	U	11	U	11	UJ
IS-1,3-DICHLOROPROPENE	6	U	6	U	6	UJ
IBROMOCHLOROMETHANE	6	U	6	U	6	UJ
THYLBENZENE	6	U	6	U	6	UJ
ETHYLENE CHLORIDE	120	UJ	11	UJ	37	UJ
TYRENE	6	U	6	U	6	UJ
ETRACHLOROETHYLENE	6	U	6	U	6	UJ
OLUENE	6	=	6	U	6	UJ
RANS-1,3-DICHLOROPROPENE	6	U	6	U	6	UJ
RICHLOROETHYLENE	6	U	6	U	6	UJ
INYL ACETATE	12	U	11	U	11	UJ
INYL CHLORIDE	12	U	11	U	11	UJ
YLENES (TOTAL)	6	U	6	U	6	UJ

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte was found in the associated blank as well as in the sample.
- Unreliable result. Analyte may or may not be present in the sample.

Table D-13
(continued)

Sample ID No.	138-MSC-046		138-MSC-058		138-MSC-059		138-MSC-060		138-MSC-061		138-MSC-062	
Corehole ID No.	B3890C004		B3890C004		B3890C004		B3890C004		B3890C004		B3890C023	
Sample Depth (ft)	12 - 14		15 - 16.5		16.5 - 17.5		17.5 - 19.5		19.5 - 21.5		0 - 2	
Analyte												
1,1-TRICHLOROETHANE	6	U	6	U	6	U	6	U	6	U	8	UJ
1,1,2,2-TETRACHLOROETHANE	6	U	6	U	6	U	6	U	6	U	8	UJ
1,2-TRICHLOROETHANE	6	U	6	U	6	U	6	U	6	U	8	UJ
1,1-DICHLOROETHANE	6	U	6	U	6	U	6	U	6	U	8	UJ
1,1-DICHLOROETHYLENE	6	U	6	U	6	U	6	U	6	U	8	UJ
1,2-DICHLOROETHANE	6	U	6	U	6	U	6	U	6	U	8	UJ
1,2-DICHLOROETHENE (TOTAL)	6	U	6	U	6	U	6	U	6	U	8	UJ
1,2-DICHLOROPROPANE	6	U	6	U	6	U	6	U	6	U	8	UJ
2-BUTANONE	12	R	12	U	12	U	11	U	11	U	15	UJ
2-CHLOROETHYL VINYLETHER	12	R	12	U	12	U	11	U	11	U	15	UJ
2-HEXANONE	12	U	12	U	12	U	11	U	11	U	15	UJ
3-METHYL-2-PENTANONE	12	U	12	U	12	U	11	U	11	U	15	UJ
ACETONE	23	UJ	34	U	26	U	45	U	48	U	110	U
ACROLEIN	12	U	12	U	12	U	11	U	11	U	15	UJ
ACRYLONITRILE	12	U	12	U	12	U	11	U	11	U	15	UJ
BENZENE	6	U	6	U	6	U	6	U	6	U	8	UJ
BROMODICHLOROMETHANE	6	U	6	U	6	U	6	U	6	U	8	UJ
BROMOFORM	6	U	6	U	6	U	6	U	6	U	8	UJ
BROMOMETHANE	12	U	12	U	12	U	11	U	11	U	15	UJ
CARBON DISULFIDE	1	J	6	U	6	U	6	U	6	U	12	U
CARBON TETRACHLORIDE	6	U	6	U	6	U	6	U	6	U	8	UJ
CHLOROBENZENE	6	U	6	U	6	U	6	U	6	U	8	UJ
CHLOROETHANE	12	U	12	U	12	U	11	U	11	U	15	UJ
CHLOROFORM	6	U	6	U	6	U	6	U	6	U	8	UJ
CHLOROMETHANE	12	U	12	U	12	U	11	U	11	U	15	UJ
CIS-1,3-DICHLOROPROPENE	6	U	6	U	6	U	6	U	6	U	8	UJ
DIBROMOCHLOROMETHANE	6	U	6	U	6	U	6	U	6	U	8	UJ
ETHYLBENZENE	6	U	6	U	6	U	6	U	6	U	8	UJ
METHYLENE CHLORIDE	27	UJ	29	U	41	U	50	U	46	U	220	U
STYRENE	6	U	6	U	6	U	6	U	6	U	8	UJ
TETRACHLOROETHYLENE	6	U	6	U	6	U	6	U	6	U	8	UJ
TOLUENE	6	U	6	U	6	U	6	U	6	U	8	UJ
TRANS-1,3-DICHLOROPROPENE	6	U	6	U	6	U	6	U	6	U	8	UJ
TRICHLOROETHYLENE	6	U	6	U	6	U	6	U	6	U	8	UJ
VINYL ACETATE	12	U	12	U	12	U	11	U	11	U	15	UJ
VINYL CHLORIDE	12	U	12	U	12	U	11	U	11	U	15	UJ
XYLENES (TOTAL)	6	U	4	J	6	U	6	U	6	U	4	J

Concentration Units - µg/kg - micrograms per kilogram.

- J - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- = - No data qualifier required.
- B - The analyte was found in the associated blank as well as in the sample.
- R - Unreliable result. Analyte may or may not be present in the sample.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-13
(continued)

Page 3 of 12

Sample ID No.	138-MSC-028	138-MSC-031	138-MSC-032	138-MSC-038	138-MSC-039	138-MSC-043
Well ID No.	83890C022	83890C022-1	83890C022-1	83890C022-2	83890C022-2	83890C004
Sample Depth (ft)	4 - 6	8 - 10	10 - 12	12 - 12.8	13 - 13.9	6 - 8
Analyte						
1,1-TRICHLOROETHANE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
1,2,2-TETRACHLOROETHANE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
1,2-TRICHLOROETHANE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
1-DICHLOROETHANE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
1-DICHLOROETHYLENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
2-DICHLOROETHANE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
2-DICHLOROETHENE (TOTAL)	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
2-DICHLOROPROPANE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
BUTANONE	3 J	12 R	12 UJ	11 U	11 U	13 U
CHLOROETHYL VINYLETHER	15 UJ	12 R	12 UJ	11 U	11 U	13 U
HEXANONE	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
METHYL-2-PENTANONE	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
ETONE	360 J	240 UJ	160 UJ	32 UJ	68 UJ	92 U
OLEIN	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
NYLONITRILE	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
4ZENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
DIMODICHLOROMETHANE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
DIMOFORM	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
DIMOMETHANE	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
RBON DISULFIDE	2 J	6 UJ	6 UJ	5 J	6 U	12 U
RBON TETRACHLORIDE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
ROBENZENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
ROETHANE	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
ROFORM	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
ROMETHANE	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
S-1,3-DICHLOROPROPENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
BROMOCHLOROMETHANE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
YLBENZENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
HYLENE CHLORIDE	60 UJ	45 UJ	20 UJ	43 U	22 U	100 U
RENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
RACHLOROETHYLENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
UENE	3 J	6 UJ	6 UJ	6 U	6 U	1 J
NS-1,3-DICHLOROPROPENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
ICHLOROETHYLENE	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U
YL ACETATE	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
YL CHLORIDE	15 UJ	12 UJ	12 UJ	11 U	11 U	13 U
EMES (TOTAL)	8 UJ	6 UJ	6 UJ	6 U	6 U	6 U

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte was found in the associated blank as well as in the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.

Table D-13
(continued)

Page 5 of 12

Sample ID No.	138-MSC-063		138-MSC-064		138-MSC-066		138-MSC-067		138-MSC-077		138-MSC-079	
Well ID No.	B3890C023		B3890C023		B3890C023		B3890C023		B3890C024		B3890C005	
Sample Depth (ft)	2 - 4		4 - 6		0 - 8		12 - 14		6 - 8		0 - 2	
Analyte												
1,1-TRICHLOROETHANE	10	U	6	U	6	U	6	U	8	U	6	U
1,2,2-TETRACHLOROETHANE	10	U	6	U	6	UJ	6	U	8	U	6	U
1,2-TRICHLOROETHANE	10	U	6	U	6	U	6	U	8	U	6	U
1-DICHLOROETHANE	10	U	6	U	6	U	6	U	8	U	6	U
1-DICHLOROETHYLENE	10	U	6	U	6	UJ	6	U	8	U	6	U
2-DICHLOROETHANE	10	U	6	U	6	UJ	6	U	8	U	6	U
2-DICHLOROETHENE (TOTAL)	10	U	6	U	6	UJ	6	U	8	U	6	U
2-DICHLOROPROPANE	10	U	6	U	6	U	6	U	8	U	6	U
BUTANONE	19	U	11	U	13	U	11	U	16	UJ	11	UJ
CHLOROETHYLVINYLETHER	19	U	11	U	13	U	11	U	16	U	11	U
HEXANONE	19	U	11	U	13	UJ	11	U	16	UJ	11	UJ
METHYL-2-PENTANONE	19	U	11	U	13	UJ	11	U	16	U	11	U
ACETONE	77	UJ	23	UJ	56	UJ	19	U	22	UJ	27	UJ
ACROLEIN	19	U	11	U	13	UJ	11	U	16	U	11	U
ACRYLONITRILE	19	U	11	U	13	UJ	11	U	16	U	11	U
ANILINE	10	U	6	U	6	U	6	U	8	U	6	U
MONOCHLOROMETHANE	10	U	6	U	6	U	6	U	8	U	6	U
MONOFORM	10	U	6	U	6	U	6	U	8	U	6	U
MONOMETHANE	19	U	11	U	13	UJ	11	U	16	U	11	U
ARBON DISULFIDE	10	U	6	U	6	UJ	6	U	8	UJ	6	UJ
ARBON TETRACHLORIDE	10	U	6	U	6	U	6	U	8	U	6	U
ARBORBENZENE	10	U	6	U	6	UJ	6	U	8	U	6	U
ARBORETHANE	19	U	11	U	13	UJ	11	U	16	U	11	U
ARBORFORM	10	U	6	U	6	UJ	6	U	8	U	6	U
ARBORMETHANE	19	U	11	U	13	UJ	9	J	16	U	11	U
S-1,3-DICHLOROPROPENE	10	U	6	U	6	U	6	U	8	U	6	U
BROMOCHLOROMETHANE	10	U	6	U	6	U	6	U	8	U	6	U
ETHYLBENZENE	10	UJ	6	U	6	UJ	6	U	8	U	6	U
ETHYLENE CHLORIDE	97	UJ	40	UJ	82	UJ	36	U	61	UJ	49	J
ETHYLENE	10	U	6	U	6	UJ	6	U	8	U	6	U
TRICHLOROETHYLENE	10	U	6	U	6	UJ	6	U	8	U	6	U
ETHYLENE	3	J	6	U	25	J	6	U	8	U	3	J
TRANS-1,3-DICHLOROPROPENE	10	U	6	U	6	U	6	U	8	U	6	U
TRICHLOROETHYLENE	10	U	6	U	6	U	6	U	8	U	6	U
ETHYL ACETATE	19	U	11	U	13	U	11	U	16	U	11	U
ETHYL CHLORIDE	19	U	11	U	13	UJ	11	U	16	U	11	U
ETHYLENES (TOTAL)	10	U	6	U	6	UJ	6	U	8	U	6	U

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte was found in the associated blank as well as in the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.

Table D-13

(continued)

6 of 12

Well ID No.	138-MSC-082	138-MSC-087	138-MSC-093	138-MSC-098	138-MSC-105	138-MSC-106
Well ID No.	B3890C005	B3890C025	B3890C031	B3890C030	B3890C021	B3890C021
Well Depth (ft)	14 - 16	10 - 12	10 - 12	4 - 6	6 - 8	10 - 12
Analyte						
1-TRICHLOROETHANE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
2,2-TETRACHLOROETHANE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
2-TRICHLOROETHANE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
DICHLOROETHANE	6 U	7 U	8 U	6 U	10 UJ	6 U
DICHLOROETHYLENE	6 U	7 U	8 U	6 U	10 UJ	6 U
DICHLOROETHANE	6 U	7 U	8 U	6 U	10 UJ	6 U
DICHLOROETHENE (TOTAL)	6 U	7 U	8 U	6 U	10 UJ	6 U
DICHLOROPROPANE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
TANONE	12 BJ	170 BJ	8 J	11 UJ	34 J	12 UJ
OROETHYLVINYLETHER	12 U	14 UJ	15 U	11 U	19 UJ	12 U
XANONE	12 UJ	14 UJ	15 UJ	11 UJ	19 UJ	12 UJ
THYL-2-PENTANONE	12 U	14 UJ	15 U	11 U	19 UJ	12 U
ONE	170 J	1500 J	320 UJ	35 UJ	2200 J	150 UJ
LEIN	12 U	14 UJ	15 U	11 U	19 UJ	12 U
LONITRILE	12 U	14 UJ	15 U	11 U	19 UJ	12 U
ENE	6 U	7 UJ	8 U	6 U	10 UJ	21 =
ODICHLOROMETHANE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
OFORM	6 U	7 UJ	8 U	6 U	10 UJ	6 U
OMETHANE	12 U	14 U	15 U	11 U	19 UJ	12 U
ON DISULFIDE	6 UJ	29 BJ	8 UJ	6 UJ	20 UJ	6 UJ
ON TETRACHLORIDE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
ROBENZENE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
ROETHANE	12 U	14 U	15 U	11 U	19 UJ	12 U
ROFORM	6 U	7 U	8 U	6 U	10 UJ	6 U
ROMETHANE	12 U	14 U	15 U	11 U	19 UJ	12 U
1,3-DICHLOROPROPENE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
OMOCHLOROMETHANE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
LBENZENE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
YLENE CHLORIDE	27 UJ	95 BJ	57 UJ	52 UJ	160 BJ	32 UJ
ENE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
ACHLOROETHYLENE	6 U	12 UJ	8 U	6 U	10 UJ	6 U
ENE	6 U	160 J	24 =	5 J	130 J	5 J
S-1,3-DICHLOROPROPENE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
HLOROETHYLENE	6 U	7 UJ	8 U	6 U	10 UJ	6 U
L ACETATE	12 U	14 UJ	15 U	11 U	19 UJ	12 U
L CHLORIDE	12 U	14 U	15 U	11 U	19 UJ	12 U
NES (TOTAL)	6 U	3 J	8 U	6 U	2 J	6 U

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

No data qualifier required.

The analyte was found in the associated blank as well as in the sample.

Unreliable result. Analyte may or may not be present in the sample.

Analyte present; reported as an estimated value.

Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-13
(continued)

Page 7 of 12

Sample ID No.	138-MSC-113	138-MSC-122	138-MSC-125	138-MSC-127	138-MSC-142	138-MSC-145
Borehole ID No.	B3890C012	B3890C033	B3890C027	B3890C027	B3890C032	B3890C010
Sample Depth (ft)	10 - 12	5 - 7	4 - 6	8 - 10	4 - 6	6 - 8
Analyte						
1,1,1-TRICHLOROETHANE	10	U	6	U	6	U
1,1,2,2-TETRACHLOROETHANE	10	U	6	U	6	U
1,1,2-TRICHLOROETHANE	10	U	6	U	6	U
1,1-DICHLOROETHANE	10	U	6	U	6	U
1,1-DICHLOROETHYLENE	10	U	6	U	6	U
1,2-DICHLOROETHANE	10	U	6	U	6	U
1,2-DICHLOROETHENE (TOTAL)	10	U	6	U	6	U
1,2-DICHLOROPROPANE	10	U	6	U	6	U
2-BUTANONE	6	J	11	U	12	U
2-CHLOROETHYL VINYLETHER	19	U	11	U	12	U
2-HEXANONE	19	UJ	11	U	12	U
4-METHYL-2-PENTANONE	19	U	11	U	12	U
ACETONE	610	J	12	UJ	24	J
ACROLEIN	19	U	11	U	12	U
ACRYLONITRILE	19	U	11	U	12	U
BENZENE	10	U	6	U	6	U
BROMODICHLOROMETHANE	10	U	6	U	6	U
BROMOFORM	10	U	6	U	6	U
BROMOMETHANE	19	U	11	U	12	U
CARBON DISULFIDE	7	UJ	6	U	6	U
CARBON TETRACHLORIDE	10	U	6	U	6	U
CHLOROBENZENE	10	U	6	U	6	U
CHLOROETHANE	19	U	11	U	12	U
CHLOROFORM	10	U	6	U	6	U
CHLOROMETHANE	19	U	11	U	12	U
CIS-1,3-DICHLOROPROPENE	10	U	6	U	6	U
DIBROMOCHLOROMETHANE	10	U	6	U	6	U
ETHYLBENZENE	10	U	6	U	6	U
METHYLENE CHLORIDE	160	BJ	41	UJ	24	UJ
STYRENE	10	U	6	U	6	U
TETRACHLOROETHYLENE	10	U	6	U	6	U
TOLUENE	8	J	6	U	2	J
TRANS-1,3-DICHLOROPROPENE	10	U	6	U	6	U
TRICHLOROETHYLENE	10	U	6	U	6	U
VINYL ACETATE	19	U	11	U	12	U
VINYL CHLORIDE	19	U	11	U	12	U
ETHYLENES (TOTAL)	10	U	6	U	6	U

Concentration Units - µg/kg - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- U - No data qualifier required.
- J - The analyte was found in the associated blank as well as in the sample.
- U - Unreliable result. Analyte may or may not be present in the sample.
- U - Analyte present; reported as an estimated value.
- U - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-13
(continued)

8 of 12

Well ID No. hole ID No. Well Depth (ft)	138-MSC-150 B3890C028 8 - 11	138-MSC-167 B3890C017 12 - 14	138-MSC-171 B3890C018 4 - 6	138-MSC-178 B3890C014 12 - 14	138-MSC-180 B3890C026 0 - 2	138-MSC-183 B3890C026 12 - 14
Analyte						
1-TRICHLOROETHANE	6 U	6 U	6 U	6 U	12 UJ	8 U
2,2-TETRACHLOROETHANE	6 UJ	6 U	6 U	6 U	12 UJ	8 U
2-TRICHLOROETHANE	6 U	6 U	6 U	6 U	12 UJ	8 U
DICHLOROETHANE	6 U	6 U	6 U	6 U	12 UJ	8 U
DICHLOROETHYLENE	6 U	6 U	6 U	6 U	12 UJ	8 U
DICHLOROETHANE	6 U	6 U	6 U	6 U	12 UJ	8 U
DICHLOROETHENE (TOTAL)	6 U	6 U	6 U	6 U	12 UJ	8 U
DICHLOROPROPANE	6 U	6 U	6 U	6 U	12 UJ	8 U
TANONE	11 U	11 UJ	11 UJ	11 UJ	23 UJ	15 UJ
LOROETHYLVINYLETHER	11 U	11 U	11 U	11 U	23 UJ	15 U
XANONE	6 UJ	11 UJ	11 UJ	11 UJ	23 UJ	15 UJ
THYL-2-PENTANONE	11 UJ	11 U	11 U	11 U	23 UJ	15 U
ONE	30 J	1100 J	130 J	88 UJ	37 UJ	680 UJ
LEIN	11 U	11 U	11 U	11 U	23 UJ	15 UJ
LONITRILE	6 J	11 U	11 U	11 U	23 UJ	15 U
ENE	2 J	6 U	6 U	6 U	12 UJ	8 U
ODICHLOROMETHANE	6 U	6 U	6 U	6 U	12 UJ	8 U
OFORM	6 U	6 U	6 U	6 U	12 UJ	8 U
OMETHANE	11 U	11 U	11 U	11 U	23 UJ	15 U
ON DISULFIDE	6 U	6 UJ	6 UJ	7 UJ	12 UJ	8 UJ
ON TETRACHLORIDE	6 U	6 U	6 U	6 U	12 UJ	8 U
ROBENZENE	6 UJ	6 U	6 U	6 U	12 UJ	8 U
ROETHANE	11 U	11 U	11 U	11 U	23 UJ	15 U
ROFORM	6 U	6 U	6 U	6 U	12 UJ	8 U
ROMETHANE	1 J	11 U	11 U	11 U	23 UJ	15 U
1,3-DICHLOROPROPENE	6 U	6 U	6 U	6 U	12 UJ	8 U
OMOCHLOROMETHANE	6 U	6 U	6 U	6 U	12 UJ	8 U
LBENZENE	6 UJ	6 U	6 U	6 U	12 UJ	8 U
YLENE CHLORIDE	28 UJ	36 UJ	38 UJ	32 UJ	67 UJ	41 UJ
ENE	6 UJ	6 U	6 U	6 U	12 UJ	8 U
ACHLOROETHYLENE	6 UJ	6 U	6 U	6 U	12 UJ	8 U
ENE	1 J	6 U	6 U	6 U	12 UJ	8 U
S-1,3-DICHLOROPROPENE	6 U	6 U	6 U	6 U	12 UJ	8 U
HLOOROETHYLENE	6 U	6 U	6 U	6 U	12 UJ	8 U
L ACETATE	11 U	11 U	11 U	11 U	23 UJ	15 U
L CHLORIDE	11 U	11 U	11 U	11 U	23 UJ	15 U
NES (TOTAL)	6 UJ	6 U	6 U	6 U	12 UJ	8 U

centration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
 No data qualifier required.
 The analyte was found in the associated blank as well as in the sample.
 Unreliable result. Analyte may or may not be present in the sample.
 Analyte present: reported as an estimated value.

Table D-13
(continued)

Page 9 of 12

Sample ID No.	138-MSC-184		138-MSC-196		138-MSC-202		138-MSC-208		138-MSC-215		138-MSC-223	
Borehole ID No.	B3890C012		B3890C016		B3890C009		B3890C011		B3890C029		B3890C001-2	
Sample Depth (ft)	14 - 16		14 - 16		8 - 10		12 - 14		12 - 14		4 - 6	
Analyte												
,1,1-TRICHLOROETHANE	6	UJ	5	J	6	UJ	6	U	7	U	6	U
,1,2,2-TETRACHLOROETHANE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
,1,2-TRICHLOROETHANE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
,1-DICHLOROETHANE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
,1-DICHLOROETHYLENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
,2-DICHLOROETHANE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
,2-DICHLOROETHENE (TOTAL)	6	UJ	6	U	6	UJ	6	U	7	U	6	U
,2-DICHLOROPROPANE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
-BUTANONE	11	UJ	11	UJ	12	UJ	12	U	14	UJ	11	U
-CHLOROETHYLVINYLETHER	11	UJ	11	U	12	UJ	12	U	14	U	11	U
-HEXANONE	11	UJ	11	UJ	12	UJ	12	U	14	UJ	11	U
-METHYL-2-PENTANONE	11	UJ	11	U	12	UJ	12	U	14	U	11	U
ACETONE	14	UJ	300	UJ	21	UJ	37	UJ	60	UJ	15	UJ
ACROLEIN	11	UJ	11	UJ	12	UJ	12	U	14	UJ	11	U
ACRYLONITRILE	11	UJ	11	U	12	UJ	12	U	14	U	11	U
ANIZENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
MONODICHLOROMETHANE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
MONOFORM	6	UJ	6	U	6	UJ	6	U	7	U	6	U
MONOMETHANE	11	UJ	11	U	12	UJ	12	U	14	U	11	U
CARBON DISULFIDE	6	UJ	6	UJ	6	UJ	6	U	7	UJ	6	U
CARBON TETRACHLORIDE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
CHLOROBENZENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
CHLOROETHANE	11	UJ	11	U	12	UJ	12	UJ	14	U	11	U
CHLOROFORM	6	UJ	6	U	6	UJ	6	U	7	U	6	U
CHLOROMETHANE	11	UJ	11	U	12	UJ	12	U	14	U	11	U
CIS-1,3-DICHLOROPROPENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
ISOBROMOCHLOROMETHANE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
PHYLBENZENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
ETHYLENE CHLORIDE	25	UJ	120	UJ	30	UJ	87	UJ	77	UJ	31	UJ
XYRENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
ETRACHLOROETHYLENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
OLUENE	6	UJ	2	J	6	UJ	6	U	7	U	6	U
TRANS-1,3-DICHLOROPROPENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
RICHLOROETHYLENE	6	UJ	6	U	6	UJ	6	U	7	U	6	U
INYL ACETATE	11	UJ	11	U	12	UJ	12	U	14	U	11	U
INYL CHLORIDE	11	UJ	11	U	12	UJ	12	U	14	U	11	U
YLENES (TOTAL)	6	UJ	6	U	6	UJ	6	U	7	U	6	U

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte was found in the associated blank as well as in the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present: reported as an estimated value.

Table D-13

(continued)

e 10 of 12

Sample ID No. Well ID No. Sample Depth (ft)	138-MS-C-231 B3890C003-2 0 - 2	138-MS-C-243 B3890C034 6 - 8	138-MS-C-272 B3890C013 12 - 14	138-MS-C-274 B3890C008-1 0 - 2	138-MS-C-280 B3890C020 0 - 2	138-MS-C-284 B3890C020 8 - 10
Analyte						
1,1-TRICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2,2-TETRACHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-TRICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHYLENE	6 U	6 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,1-DICHLOROETHENE (TOTAL)	6 U	6 U	6 U	2 J	6 U	6 U
1,1-DICHLOROPROPANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROPROPANE	12 UJ	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHYL VINYL ETHER	12 U	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	12 UJ	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	12 U	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	140 UJ	69 UJ	23 U	26 UJ	17 UJ	58 UJ
1,2-DICHLOROETHANE	12 UJ	12 UJ	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	12 U	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	12 U	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	12 U	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	12 U	12 UJ	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	12 U	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	92 UJ	110 UJ	32 UJ	54 BJ	50 BJ	41 UJ
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U
1,2-DICHLOROETHANE	12 U	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	12 U	12 U	11 U	12 U	11 U	12 U
1,2-DICHLOROETHANE	6 U	6 U	6 U	6 U	6 U	6 U

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

No data qualifier required.

The analyte was found in the associated blank as well as in the sample.

Unreliable result. Analyte may or may not be present in the sample.

Analyte present; reported as an estimated value.

Table D-13

(continued)

Page 11 of 12

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-289 B3890C019 6 - 8	138-MSC-291 B3890C008-1 14 - 16	138-MSC-307 B3890C006-2 4 - 6	138-MSC-308 B3890C006-2 6 - 8	138-MSC-314 B3890C022-3 14 - 16	138-MSC-320 B3890C015-1 12 - 14
Analyte						
1,1,1-TRICHLOROETHANE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
1,1,2,2-TETRACHLOROETHANE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
1,1,2-TRICHLOROETHANE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
1,1-DICHLOROETHANE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
1,1-DICHLOROETHYLENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
1,2-DICHLOROETHANE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
1,2-DICHLOROETHENE (TOTAL)	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
1,2-DICHLOROPROPANE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
2-BUTANONE	16 U	11 U	14 J	22 UJ	12 UJ	12 U
2-CHLOROETHYLVINYLETHER	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
2-HEXANONE	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
4-METHYL-2-PENTANONE	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
ACETONE	38 BJ	31 UJ	150 BJ	70 UJ	12 UJ	49 BJ
ACROLEIN	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
ACRYLONITRILE	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
BENZENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
BROMODICHLOROMETHANE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
BROMOFORM	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
BROMOMETHANE	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
CARBON DISULFIDE	8 U	6 U	6 UJ	4 J	6 UJ	6 U
CARBON TETRACHLORIDE	8 U	6 UJ	6 UJ	11 UJ	6 UJ	6 U
CHLOROBENZENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
CHLOROETHANE	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
CHLOROFORM	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
CHLOROMETHANE	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
CIS-1,3-DICHLOROPROPENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
DIBROMOCHLOROMETHANE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
ETHYLBENZENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
METHYLENE CHLORIDE	61 BJ	48 UJ	23 UJ	67 UJ	15 UJ	43 BJ
STYRENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
TETRACHLOROETHYLENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
TOLUENE	8 U	6 U	3 J	11 UJ	6 UJ	6 U
TRANS-1,3-DICHLOROPROPENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
TRICHLOROETHYLENE	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U
VINYL ACETATE	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
VINYL CHLORIDE	16 U	11 U	13 UJ	22 UJ	12 UJ	12 U
XYLENES (TOTAL)	8 U	6 U	6 UJ	11 UJ	6 UJ	6 U

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

B - The analyte was found in the associated blank as well as in the sample.

R - Unreliable result. Analyte may or may not be present in the sample.

J - Analyte present; reported as an estimated value.

Table D-13
(continued)

Page 12 of 12

Sample ID No.	138-MSC-324		138-MSC-329		138-MSC-330		138-MSC-334		138-MSC-336		138-MSC-338		138-MSC-339	
Borehole ID No.	B3890C028-1		B3890C024-2		B3890C024-2		B3890C030-1		B3890C030-2		B3890C010-1		B3890C010-1	
Sample Depth (ft)	6 - 8		6 - 8		10 - 14		4 - 6		10 - 14		0 - 2		4 - 8	
Analyte														
1,1,1-TRICHLOROETHANE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
1,1,2,2-TETRACHLOROETHANE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
1,1,2-TRICHLOROETHANE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
1,1-DICHLOROETHANE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
1,1-DICHLOROETHYLENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
1,2-DICHLOROETHANE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
1,2-DICHLOROETHENE (TOTAL)	6	U	8	U	6	U	6	U	6	U	6	U	6	U
1,2-DICHLOROPROPANE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
2-BUTANONE	11	U	15	U	11	U	13	U	11	U	13	U	11	U
2-CHLOROETHYLVINYLETHER	11	U	15	U	11	U	13	U	11	U	13	U	11	U
2-HEXANONE	11	U	15	U	11	U	13	U	11	U	13	U	11	U
4-METHYL-2-PENTANONE	11	U	15	U	11	U	13	U	11	U	13	U	11	U
ACETONE	51	BJ	25	UJ	32	UJ	18	UJ	62	UJ	13	U	36	UJ
ACROLEIN	11	U	15	U	11	U	13	U	11	U	13	U	11	U
ACRYLONITRILE	11	U	15	U	11	U	13	U	11	U	13	U	11	U
BENZENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
BROMODICHLOROMETHANE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
BROMOFORM	6	U	8	U	6	U	6	U	6	U	6	U	6	U
BROMOMETHANE	11	U	15	UJ	11	UJ	13	UJ	11	UJ	13	UJ	11	UJ
CARBON DISULFIDE	6	U	8	U	2	U	6	U	6	U	6	U	6	U
CARBON TETRACHLORIDE	6	U	8	U	6	UJ	6	U	6	U	6	U	6	U
CHLOROENZENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
CHLOROETHANE	11	U	15	UJ	11	UJ	13	UJ	11	UJ	13	UJ	11	UJ
CHLOROFORM	6	U	8	U	6	U	6	U	6	U	6	U	6	U
CHLOROMETHANE	11	U	15	UJ	11	UJ	13	UJ	11	UJ	13	UJ	11	UJ
CIS-1,3-DICHLOROPROPENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
DIBROMOCHLOROMETHANE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
ETHYLBENZENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
METHYLENE CHLORIDE	37	UJ	110	UJ	68	UJ	72	UJ	81	UJ	48	UJ	77	UJ
STYRENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
TETRACHLOROETHYLENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
TOLUENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
TRANS-1,3-DICHLOROPROPENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
TRICHLOROETHYLENE	6	U	8	U	6	U	6	U	6	U	6	U	6	U
VINYL ACETATE	11	U	15	U	11	U	13	U	11	U	13	U	11	U
VINYL CHLORIDE	11	U	15	UJ	11	UJ	13	UJ	11	UJ	13	UJ	11	UJ
XYLENES (TOTAL)	6	U	8	U	6	U	6	U	6	U	6	U	6	U

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

B - The analyte was found in the associated blank as well as in the sample.

R - Unreliable result. Analyte may or may not be present in the sample.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
BNAEs,
MISS Onsite Soil Samples

Page 1 of 24

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-003 B3890C001 4 - 6	138-MSC-005 B3890C001 10 - 12	138-MSC-006 B3890C001 0 - 10	138-MSC-007 B3890C001-1 4 - 6	138-MSC-008 B3890C003 0 - 2	138-MSC-012 B3890C003-1 10 - 12
Analyte						
1,2,4-TRICHLOROBENZENE	390 U	460 UJ	410 U	430 U	420 U	430 U
1,2-DICHLOROBENZENE	390 U	460 UJ	410 U	430 U	420 U	430 U
1,2-DIPHENYLHYDRAZINE	390 UR	460 UJ	410 U	430 U	420 U	430 U
1,3-DICHLOROBENZENE	390 U	460 UJ	410 U	430 U	420 U	430 U
1,4-DICHLOROBENZENE	390 U	460 UJ	410 U	430 U	420 U	430 U
2,4,5-TRICHLOROPHENOL	2000 U	2300 UJ	2100 U	2100 U	2100 U	2200 U
2,4,6-TRICHLOROPHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
2,4-DICHLOROPHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
2,4-DIMETHYLPHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
2,4-DINITROPHENOL	2000 U	2300 UJ	2100 U	2100 U	2100 U	2200 U
2,4-DINITROTOLUENE	390 U	460 UJ	410 U	430 U	420 U	430 U
2,6-DINITROTOLUENE	390 U	460 UJ	410 U	430 U	420 U	430 U
2-CHLORONAPHTHALENE	390 U	460 UJ	410 U	430 U	420 U	430 U
2-CHLOROPHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
2-METHYLNAPHTHALENE	390 U	460 UJ	410 U	430 U	420 U	430 U
2-METHYLPHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
2-NITROANILINE	2000 U	2300 UJ	2100 U	2100 U	2100 U	2200 U
2-NITROPHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
3,3'-DICHLOROBENZIDINE	790 U	920 UJ	830 UJ	850 U	850 U	860 U
3-NITROANILINE	2000 U	2300 UJ	2100 U	2100 U	2100 U	2200 U
4,6-DINITRO-2-METHYLPHENOL	2000 U	2300 UJ	2100 U	2100 U	2100 U	2200 U
4-BROMOPHENYL-PHENYLETHER	390 U	460 UJ	410 U	430 U	420 U	430 U
4-CHLORO-3-METHYLPHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
4-CHLOROANILINE	390 U	460 UJ	410 U	430 U	420 U	430 U
4-CHLOROPHENYL-PHENYLETHER	390 U	460 UJ	410 U	430 U	420 U	430 U
4-METHYLPHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
4-NITROANILINE	2000 U	2300 UJ	2100 U	2100 U	2100 U	2200 U
4-NITROPHENOL	2000 UJ	2300 UJ	2100 U	2100 U	2100 U	2200 U
ACENAPHTHENE	390 U	460 UJ	83 J	62 J	420 U	430 U
ACENAPHTHYLENE	390 U	460 UJ	410 U	430 U	420 U	430 U
ANTHRACENE	390 U	460 UJ	130 J	160 J	420 U	430 U
BENZIDINE	2000 U	2300 UJ	2100 UR	2100 U	2100 U	2200 U
BENZO(A)ANTHRACENE	67 J	460 UJ	430 =	370 J	110 J	430 U
BENZO(A)PYRENE	56 J	460 UJ	350 J	350 J	110 J	430 U
BENZO(B)FLUORANTHENE	74 J	460 UJ	350 J	230 J	130 J	430 U
BENZO(G,H,I)PERYLENE	390 U	460 UJ	170 J	130 J	420 U	430 U

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

B - The analyte is found in the associated blank as well as the sample.

R - Unreliable result. Analyte may or may not be present in the sample.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Page 2 of 24

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-003 B3890C001 4 - 6	138-MSC-005 B3890C001 10 - 12	138-MSC-006 B3890C001 0 - 10	138-MSC-007 B3890C001-1 4 - 6	138-MSC-008 B3890C003 0 - 2	138-MSC-012 B3890C003-1 10 - 12
Analyte						
BENZO(K)FLUORANTHENE	68 J	460 UJ	300 J	390 J	99 J	430 U
BENZOIC ACID	2000 U	2300 UJ	2100 U	2100 U	2100 U	2200 U
BENZYL ALCOHOL	390 U	460 UJ	410 U	430 U	420 U	430 U
BIS(2-CHLOROETHOXY)METHANE	390 U	460 UJ	410 U	430 U	420 U	430 U
BIS(2-CHLOROETHYL)ETHER	390 U	460 UJ	410 U	430 U	420 U	430 U
BIS(2-CHLOROISOPROPYL)ETHER	390 U	460 UJ	410 UJ	1000 B	640 UJ	1100 B
BIS(2-ETHYLHEXYL)PHTHALATE	100 J	570 UJ	410 UJ	430 U	420 U	430 U
BUTYLBENZYLPHTHALATE	390 U	460 UJ	380 J	420 J	150 J	430 U
CHRYSENE	88 J	460 U	160 J	430 U	420 U	430 U
DI-N-BUTYLPHTHALATE	390 U	460 UJ	410 U	430 U	420 U	430 U
DI-N-OCTYLPHTHALATE	390 U	460 UJ	410 U	430 U	420 U	430 U
DIBENZ(A,H)ANTHRACENE	390 U	460 UJ	56 J	430 U	420 U	430 U
DIBENZOFURAN	390 U	460 UJ	410 U	430 U	420 U	430 U
DIETHYLPHTHALATE	390 U	460 UJ	410 U	430 U	420 U	430 U
DIMETHYLPHTHALATE	390 U	460 UJ	630 =	980 =	240 J	430 U
FLUORANTHENE	200 J	460 UJ	76 J	48 J	420 U	430 U
FLUORENE	390 U	460 UJ	410 U	430 U	420 U	430 U
HEXACHLORO BENZENE	390 U	460 UJ	410 U	430 U	420 U	430 U
HEXACHLOROBUTADIENE	390 U	460 UJ	410 U	430 U	420 U	430 U
HEXACHLOROCYCLOPENTADIENE	390 U	460 UJ	410 U	430 U	420 U	430 U
HEXACHLOROETHANE	390 U	460 UJ	170 J	130 J	420 U	430 U
INDENO(1,2,3-CD)PYRENE	390 U	460 UJ	410 U	430 U	420 U	430 U
ISOPHORONE	390 U	460 UJ	410 U	430 U	420 U	430 U
N-NITROSO-DI-N-PROPYLAMINE	390 U	460 UJ	410 U	430 U	420 U	430 U
N-NITROSODIMETHYLAMINE	390 U	460 UJ	410 U	430 U	420 U	430 U
N-NITROSODIPHENYLAMINE	390 U	460 UJ	150 J	430 U	420 U	430 U
NAPHTHALENE	390 U	460 UJ	410 U	430 U	420 U	430 U
NITROBENZENE	390 U	460 UJ	410 U	430 U	420 U	430 U
PENTACHLOROPHENOL	2000 U	2300 UJ	2100 U	2100 U	2100 U	2200 U
PHENANTHRENE	84 J	460 UJ	630 =	830 =	150 J	430 U
PHENOL	390 U	460 UJ	410 U	430 U	420 U	430 U
PYRENE	130 J	85 J	590 =	840 =	220 J	56 J

Concentration Units - µg/kg - micrograms per kilogram.

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= - No data qualifier required.

B - The analyte is found in the associated blank as well as the sample.

R - Unreliable result. Analyte may or may not be present in the sample.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Page 3 of 24

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-013 B3890C003-1 0 - 10	138-MSC-021 B3890C002 4 - 6	138-MSC-024 B3890C002 10 - 12	138-MSC-028 B3890C022 4 - 6	138-MSC-031 B3890C022-1 8 - 10	138-MSC-032 B3890C022-1 10 - 12
Analyte						
1,2,4-TRICHLOROBENZENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
1,2-DICHLOROBENZENE	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
1,2-DIPHENYLHYDRAZINE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
1,3-DICHLOROBENZENE	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
1,4-DICHLOROBENZENE	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2,4,5-TRICHLOROPHENOL	2000 U	2600 UJ	2100 UJ	2300 UJ	2100 UJ	2000 UJ
2,4,6-TRICHLOROPHENOL	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2,4-DICHLOROPHENOL	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2,4-DIMETHYLPHENOL	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2,4-DINITROPHENOL	2000 U	2600 UJ	2100 UJ	2300 UJ	2100 UJ	2000 UJ
2,4-DINITROTOLUENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2,6-DINITROTOLUENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2-CHLORONAPHTHALENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2-CHLOROPHENOL	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2-METHYLNAPHTHALENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2-METHYLPHENOL	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
2-NITROANILINE	2000 U	2600 UJ	2100 UJ	2300 UJ	2100 UJ	2000 UJ
2-NITROPHENOL	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
3,3'-DICHLOROBENZIDINE	820 UJ	1000 UJ	830 UJ	910 UJ	820 UJ	790 UJ
3-NITROANILINE	2000 U	2600 UJ	2100 UJ	2300 UJ	2100 UJ	2000 UJ
4,6-DINITRO-2-METHYLPHENOL	2000 U	2600 UJ	2100 UJ	2300 UJ	2100 UJ	2000 UJ
4-BROMOPHENYL-PHENYLETHER	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
4-CHLORO-3-METHYLPHENOL	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
4-CHLOROANILINE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
4-CHLOROPHENYL-PHENYLETHER	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
4-METHYLPHENOL	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
4-NITROANILINE	2000 U	2600 UJ	2100 UJ	2300 UJ	2100 UJ	2000 UJ
4-NITROPHENOL	2000 U	2600 UJ	2100 UJ	2300 UJ	2100 UJ	2000 UJ
ACENAPHTHENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
ACENAPHTHYLENE	410 U	520 UJ	420 UJ	73 J	410 UJ	390 UJ
ANTHRACENE	410 U	350 J	420 UJ	160 J	410 UJ	390 UJ
BENZIDINE	2000 UR	2600 UJ	2100 UJ	2300 UJ	410 UJ	2000 UJ
BENZO(A)ANTHRACENE	110 J	2700 J	420 UJ	1000 J	70 J	390 UJ
BENZO(A)PYRENE	64 J	2000 J	420 UJ	630 J	52 J	390 UJ
BENZO(B)FLUORANTHENE	68 J	2100 J	420 UJ	660 J	59 J	390 UJ
BENZO(G,H,I)PERYLENE	410 U	1200 J	420 UJ	510 J	410 UJ	390 UJ

Concentration Units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

= - No data qualifier required.

B - The analyte is found in the associated blank as well as the sample.

R - Unreliable result. Analyte may or may not be present in the sample.

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Table D-14
(continued)

Page 4 of 24

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-013 B3890C003-1 0 - 10	138-MSC-021 B3890C002 4 - 6	138-MSC-024 B3890C002 10 - 12	138-MSC-028 B3890C022 4 - 6	138-MSC-031 B3890C022-1 8 - 10	138-MSC-032 B3890C022-1 10 - 12
Analyte						
BENZO(K)FLUORANTHENE	49 J	1600 J	420 UJ	740 J	56 J	390 UJ
BENZOIC ACID	2000 U	2600 UJ	2100 UJ	2300 UJ	72 J	2000 UJ
BENZYL ALCOHOL	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
BIS(2-CHLOROETHOXY)METHANE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
BIS(2-CHLOROETHYL)ETHER	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
BIS(2-CHLOROISOPROPYL)ETHER	410 UJ	520 UJ	420 UJ	460 UJ	400 UJ	390 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
BUTYLBENZYLPHthalATE	410 U	520 UJ	420 UJ	1000 J	81 J	390 UJ
CHRYSENE	110 J	2600 J	420 UJ	460 UJ	670 UJ	390 UJ
DI-N-BUTYLPHthalATE	410 U	57 UJ	420 UJ	460 UJ	410 UJ	390 UJ
DI-N-OCTYLPHthalATE	410 U	520 UJ	420 UJ	170 J	410 UJ	390 UJ
DIBENZ(A,H)ANTHRACENE	410 U	560 J	420 UJ	460 UJ	410 UJ	390 UJ
DIBENZOFURAN	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
DIETHYLPHthalATE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
DIMETHYLPHthalATE	410 U	520 UJ	420 UJ	2000 J	120 J	390 UJ
FLUORANTHENE	110 J	4000 J	420 UJ	460 UJ	410 UJ	390 UJ
FLUORENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
HEXACHLOROBENZENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
HEXACHLOROBUTADIENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
HEXACHLOROCYCLOPENTADIENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
HEXACHLOROETHANE	410 UJ	520 UJ	420 UJ	520 J	410 UJ	390 UJ
INDENO(1,2,3-CD)PYRENE	410 U	1300 J	420 UJ	460 UJ	410 UJ	390 UJ
ISOPHORONE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
N-NITROSO-DI-N-PROPYLAMINE	410 UJ	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
N-NITROSO-DIMETHYLAMINE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
N-NITROSO-IPHENYLAMINE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
NAPHTHALENE	410 U	520 UJ	420 UJ	460 UJ	410 UJ	390 UJ
NITROBENZENE	410 U	520 UJ	420 UJ	460 UJ	2100 UJ	2000 UJ
PENTACHLOROPHENOL	2000 U	2600 UJ	2100 UJ	2300 UJ		
PHENANTHRENE	81 J	1600 J	420 UJ	1000 J	64 J	390 UJ
PHENOL	410 UJ	520 UJ	420 UJ	460 UJ	180 J	390 UJ
PYRENE	300 J	3200 J	420 UJ	2000 J	140 J	43 J

Concentration Units - µg/kg - micrograms per kilogram.

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Table D-14

(continued)

Page 5 of 24

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-038 B3890C022-2 12 - 12.8	138-MSC-039 B3890C022-2 13 - 13.9	138-MSC-043 B3890C004 6 - 8	138-MSC-046 B3890C004 12 - 14	138-MSC-058 B3890C004 15 - 16.5	138-MSC-059 B3890C004 16.5 - 17.5
Analyte						
1,2,4-TRICHLOROBENZENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
1,2-DICHLOROBENZENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
1,2-DIPHENYLHYDRAZINE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
1,3-DICHLOROBENZENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
1,4-DICHLOROBENZENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2,4,5-TRICHLOROPHENOL	2200 UJ	2000 UJ	2200 UJ	2200 UJ	2000 U	1900 U
2,4,6-TRICHLOROPHENOL	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2,4-DICHLOROPHENOL	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2,4-DIMETHYLPHENOL	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2,4-DINITROPHENOL	2200 UJ	2000 UJ	2200 UJ	2200 UJ	2000 U	1900 U
2,4-DINITROTOLUENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2,6-DINITROTOLUENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2-CHLORONAPHTHALENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2-CHLOROPHENOL	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2-METHYLNAPHTHALENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2-METHYLPHENOL	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
2-NITROANILINE	2200 UJ	2000 UJ	2200 UJ	2200 UJ	2000 U	1900 U
2-NITROPHENOL	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
3,3'-DICHLOROBENZIDINE	880 UJ	800 UJ	860 J	890 UJ	810 U	760 U
3-NITROANILINE	2200 UJ	2000 UJ	2200 UJ	2200 UJ	2000 U	1900 U
4,6-DINITRO-2-METHYLPHENOL	2200 UJ	2000 UJ	2200 UJ	2200 UJ	2000 U	1900 U
4-BROMOPHENYL-PHENYLETHER	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
4-CHLORO-3-METHYLPHENOL	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
4-CHLOROANILINE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
4-CHLOROPHENYL-PHENYLETHER	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
4-METHYLPHENOL	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
4-NITROANILINE	2200 UJ	2000 UJ	2200 UJ	2200 UJ	2000 U	1900 U
4-NITROPHENOL	2200 UJ	2000 UJ	2200 UJ	2200 UJ	2000 U	1900 U
ACENAPHTHENE	440 UJ	400 UJ	430 UJ	440 UJ	410 U	380 U
ACENAPHTHYLENE	440 UJ	400 UJ	68 UJ	440 UJ	410 U	380 U
ANTHRACENE	64 J	100 J	77 J	440 UJ	410 U	380 U
BENZIDINE	2200 UJ	2000 UJ	2200 UJ	2200 UJ	2000 U	1900 UJ
BENZO(A)ANTHRACENE	420 J	210 J	390 U	440 UJ	87 J	63 J
BENZO(A)PYRENE	320 J	160 J	330 J	440 UJ	87 J	62 J
BENZO(B)FLUORANTHENE	290 J	130 J	390 J	440 UJ	95 J	66 J
BENZO(G,H,I)PERYLENE	220 J	65 J	240 J	440 UJ	50 J	380 U

Concentration Units - µg/kg - micrograms per kilogram.

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B - The analyte is found in the associated blank as well as the sample.

R - Unreliable result. Analyte may or may not be present in the sample.

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Table D-14
(continued)

Sample ID No.	138-MSC-038		138-MSC-039		138-MSC-043		138-MSC-046		138-MSC-058		138-MSC-059	
Corehole ID No.	B3890C022-2		B3890C022-2		B3890C004		B3890C004		B3890C004		B3890C004	
Sample Depth (ft)	12 - 12.8		13 - 13.9		6 - 8		12 - 14		15 - 16.5		16.5 - 17.5	
Analyte												
ENZO(K)FLUORANTHENE	390	J	170	J	320	J	440	UJ	70	J	41	J
ENZOIC ACID	2200	UJ	2000	UJ	270	J	2200	UJ	2000	U	1900	U
ENZYL ALCOHOL	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IS(2-CHLOROETHOXY)METHANE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IS(2-CHLOROETHYL)ETHER	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IS(2-CHLOROISOPROPYL)ETHER	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IS(2-ETHYLHEXYL)PHTHALATE	430	UJ	400	UJ	390	UJ	440	UJ	190	J	300	J
UTYLBENZYLPHthalate	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
HRYSENE	430	J	200	J	460	J	440	UJ	120	J	74	J
I-N-BUTYLPHthalate	440	UJ	400	UJ	430	UJ	440	UJ	2300	=	2000	=
I-N-OCTYLPHthalate	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IBENZ(A,H)ANTHRACENE	64	J	400	UJ	96	UJ	440	UJ	410	U	380	U
IBENZOFURAN	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IETHYLPHthalate	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IMETHYLPHthalate	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IUORANTHENE	630	J	420	J	520	J	56	J	140	J	100	J
IUORENE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IXACHLOROBENZENE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IXACHLOROBUTADIENE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IXACHLOROCYCLOPENTADIENE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IXACHLOROETHANE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
INDENO(1,2,3-CD)PYRENE	210	J	66	J	260	J	440	UJ	73	J	380	U
IOPHORONE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
I-NITROSO-DI-N-PROPYLAMINE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	UJ
I-NITROSOIMETHYLAMINE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	290	J
I-NITROSOIPHENYLAMINE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IAPHthALENE	440	UJ	400	UJ	430	UJ	440	UJ	410	U	380	U
IITROBENZENE	250	J	400	UJ	47	J	440	UJ	410	U	380	U
IENTACHLOROPHENOL	2200	UJ	2000	UJ	2200	UJ	2200	UJ	2000	U	1900	U
IHENANTHRENE	380	J	380	J	410	J	440	UJ	92	J	77	J
IHENOL	440	UJ	400	UJ	63	J	440	UJ	410	U	380	U
IYRENE	580	J	450	J	560	J	46	J	110	J	110	J

Concentration Units - µg/kg - micrograms per kilogram.

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- = - No data qualifier required.
-)- The analyte is found in the associated blank as well as the sample.
- ! - Unreliable result. Analyte may or may not be present in the sample.
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Table D-14
(continued)

Page 7 of 24

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-060 B3890C004 17.5 - 19.5	138-MSC-061 B3890C004 19.5 - 21.5	138-MSC-062 B3890C023 0 - 2	138-MSC-067 B3890C023 12 - 14	138-MSC-077 B3890C024 6 - 8	138-MSC-079 B3890C005 0 - 2
Analyte						
1,2,4-TRICHLOROBENZENE	360 U	370 U	430 U	380 U	520 U	360 U
1,2-DICHLOROBENZENE	360 U	370 U	430 U	380 U	520 U	360 U
1,2-DIPHENYLHYDRAZINE	360 UJ	370 U	430 U	380 U	520 R	360 R
1,3-DICHLOROBENZENE	360 U	370 U	430 U	380 U	520 U	360 U
1,4-DICHLOROBENZENE	360 U	370 U	430 U	380 U	520 U	360 U
2,4,5-TRICHLOROPHENOL	1800 U	1900 U	2200 U	1900 U	2600 U	1800 U
2,4,6-TRICHLOROPHENOL	360 U	370 U	430 U	380 U	520 U	360 U
2,4-DICHLOROPHENOL	360 U	370 U	430 U	380 U	520 U	360 U
2,4-DIMETHYLPHENOL	360 U	370 U	430 U	380 U	520 U	360 U
2,4-DINITROPHENOL	1800 U	1900 U	2200 U	1900 U	2600 U	1800 U
2,4-DINITROTOLUENE	360 U	370 U	430 U	380 U	520 U	360 UJ
2,6-DINITROTOLUENE	360 U	370 U	430 U	380 U	520 U	360 U
2-CHLORONAPHTHALENE	360 U	370 U	430 U	380 U	520 U	360 U
2-CHLOROPHENOL	360 U	370 U	430 U	380 U	520 U	360 U
2-METHYLNAPHTHALENE	360 U	370 U	430 U	380 U	520 U	360 U
2-METHYLPHENOL	360 U	370 U	430 U	380 U	520 U	360 U
2-NITROANILINE	1800 U	1900 U	2200 U	1900 U	2600 U	1800 U
2-NITROPHENOL	360 U	370 U	430 U	380 U	520 U	360 U
3,3'-DICHLOROBENZIDINE	730 U	740 U	860 U	770 U	1000 U	720 UJ
3-NITROANILINE	1800 U	1900 U	2200 U	1900 U	2600 U	1800 U
4,6-DINITRO-2-METHYLPHENOL	1800 U	1900 U	2200 U	1900 U	2600 U	1800 UJ
4-BROMOPHENYL-PHENYLETHER	360 U	370 U	430 U	380 U	520 U	360 U
4-CHLORO-3-METHYLPHENOL	360 U	370 U	430 U	380 U	520 U	360 U
4-CHLOROANILINE	360 U	370 U	430 U	380 U	520 U	360 U
4-CHLOROPHENYL-PHENYLETHER	360 U	370 U	430 U	380 U	520 U	360 UJ
4-METHYLPHENOL	360 U	370 U	430 U	380 U	520 U	360 U
4-NITROANILINE	1800 U	1900 U	2200 U	1900 U	2600 U	1800 UJ
4-NITROPHENOL	1800 U	1900 U	2200 U	1900 U	2600 U	1800 U
ACENAPHTHENE	360 U	370 U	430 U	380 U	520 U	360 U
ACENAPHTHYLENE	360 U	370 U	430 U	380 U	520 U	360 U
ANTHRACENE	360 U	370 U	110 J	380 U	520 U	360 UJ
BENZIDINE	1800 UJ	1900 UJ	2200 UJ	1900 UJ	2600 R	1800 U
BENZO(A)ANTHRACENE	360 U	370 U	690 =	380 U	520 U	99 J
BENZO(A)PYRENE	360 U	370 U	540 =	380 U	520 U	100 J
BENZO(B)FLUORANTHENE	38 J	370 U	550 =	40 J	520 U	99 J
BENZO(G,H,I)PERYLENE	360 U	370 U	390 J	380 U	520 U	360 UJ

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Table D-14

(continued)

Sample ID No.	138-MSC-060	138-MSC-061	138-MSC-062	138-MSC-067	138-MSC-077	138-MSC-079
Sample Depth (ft)	17.5 - 19.5	19.5 - 21.5	0 - 2	12 - 14	6 - 8	0 - 2
Analyte						
NZO(K)FLUORANTHENE	360 U	370 U	540 =	380 U	520 U	92 J
NZOIC ACID	1800 U	1900 U	2200 U	1900 U	2600 U	1800 U
NZYL ALCOHOL	360 U	370 U	430 U	380 U	520 U	360 U
S(2-CHLOROETHOXY)METHANE	360 U	370 U	430 U	380 U	520 U	360 U
S(2-CHLOROETHYL)ETHER	360 U	370 U	430 U	380 U	520 U	360 U
S(2-CHLOROISOPROPYL)ETHER	360 U	370 U	430 U	380 U	520 U	360 U
S(2-ETHYLHEXYL)PHTHALATE	240 J	87 J	290 J	140 J	89 J	87 J
ITYLBENZYLPHTHALATE	360 U	370 U	100 J	200 J	520 U	360 UJ
IRYSENE	360 U	370 U	720 =	380 U	520 U	110 J
-N-BUTYLPHTHALATE	2700 =	3200 =	4300 =	3800 =	520 U	51 J
-N-OCTYLPHTHALATE	360 U	370 U	430 U	380 U	520 U	360 UJ
BENZ(A,H)ANTHRACENE	360 U	370 U	100 J	380 U	520 U	360 UJ
BENZOFURAN	360 U	370 U	430 U	380 U	520 U	360 UJ
ETHYLPHTHALATE	360 U	370 U	430 U	380 U	520 U	360 U
METHYLPHTHALATE	360 U	370 U	430 U	380 U	520 U	360 U
UORANTHENE	43 J	370 U	1300 =	380 U	520 U	200 J
UORENE	360 U	370 U	430 U	380 U	520 U	360 UJ
OXACHLOROBENZENE	360 U	370 U	430 U	380 U	520 U	360 UJ
OXACHLOROBUTADIENE	360 U	370 U	430 U	380 U	520 U	360 U
OXACHLOROCYCLOPENTADIENE	360 U	370 U	430 U	380 U	520 U	360 U
OXACHLOROETHANE	360 U	370 U	430 U	380 U	520 U	360 UJ
PERYLENE(1,2,3-CD)PYRENE	360 U	370 U	590 =	380 U	520 U	360 U
PHORONE	360 U	370 U	430 U	380 U	520 U	360 U
-NITROSO-DI-N-PROPYLAMINE	360 U	370 U	430 U	380 U	520 U	360 U
-NITROSODIMETHYLAMINE	360 UJ	370 UJ	430 UJ	380 UJ	520 U	360 UJ
-NITROSODIPHENYLAMINE	42 J	370 U	430 U	380 U	520 U	360 U
PHTHALENE	360 U	370 U	430 U	380 U	520 U	360 U
PTROBENZENE	360 U	370 U	430 U	380 U	520 U	360 U
PERCHLOROPHENOL	1800 U	1900 U	2200 U	1900 U	2600 U	1800 UJ
PERANTHRENE	360 U	370 U	520 =	380 U	520 U	84 J
PERENOL	360 U	370 U	430 U	380 U	520 U	360 U
PERENE	56 J	370 U	1300 =	47 J	520 U	150 J

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- J - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Sample ID No.	138-MSC-082	138-MSC-087	138-MSC-093	138-MSC-098	138-MSC-105	138-MSC-106
Well ID No.	B3890C005	B3890C025	B3890C031	B3890C030	B3890C021	B3890C021
Sample Depth (ft)	14 - 16	10 - 12	10 - 12	4 - 6	6 - 8	10 - 12
Analyte						
1,2,4-TRICHLOROBENZENE	400 U	440 U	490 U	350 U	640 U	380 U
1,2-DICHLOROBENZENE	400 U	440 U	490 U	350 U	640 U	380 U
1,2-DIPHENYLHYDRAZINE	400 R	440 R	490 R	370 NJ	640 R	380 R
1,3-DICHLOROBENZENE	400 U	440 U	490 U	350 U	640 U	380 U
1,4-DICHLOROBENZENE	400 U	440 U	490 U	350 U	640 U	380 U
1,4,5-TRICHLOROPHENOL	2000 U	2200 U	2500 U	1800 U	3200 U	1900 U
1,4,6-TRICHLOROPHENOL	400 U	440 U	490 U	350 U	640 U	380 U
1,4-DICHLOROPHENOL	400 U	440 U	490 U	350 U	640 U	380 U
1,4-DIMETHYLPHENOL	400 U	440 U	490 U	350 U	640 U	380 U
1,4-DINITROPHENOL	2000 UJ	2200 U	2500 U	1800 U	3200 U	1900 U
1,4-DINITROTOLUENE	400 U	440 UJ	490 U	350 U	640 U	380 U
1,6-DINITROTOLUENE	400 U	440 U	490 U	350 U	640 U	380 U
1-CHLORONAPHTHALENE	400 U	440 U	490 U	350 U	640 U	380 U
1-CHLOROPHENOL	400 U	440 U	490 U	350 U	640 U	380 U
1-METHYLNAPHTHALENE	400 U	440 U	490 U	350 U	640 U	380 U
1-METHYLPHENOL	400 U	440 U	490 U	350 U	640 U	380 U
1-NITROANILINE	2000 U	2200 U	2500 U	1800 U	3200 U	1900 U
1-NITROPHENOL	400 U	440 U	490 U	350 U	640 U	380 U
1,3'-DICHLOROENZIDINE	800 U	880 U	990 U	700 U	1300 U	770 U
1-NITROANILINE	2000 U	2200 U	2500 U	1800 U	3200 U	1900 U
1,6-DINITRO-2-METHYLPHENOL	2000 U	2200 UJ	2500 U	1800 U	3200 U	1900 U
1-BROMOPHENYL-PHENYLETHER	400 U	440 UJ	490 U	350 U	640 U	380 U
1-CHLORO-3-METHYLPHENOL	400 U	440 U	490 U	350 U	640 U	380 U
1-CHLOROANILINE	400 U	440 U	490 U	350 U	640 U	380 U
1-CHLOROPHENYL-PHENYLETHER	400 U	440 UJ	490 U	350 U	640 U	380 U
1-METHYLPHENOL	400 U	440 U	490 U	350 U	640 U	380 U
1-NITROANILINE	2000 U	2200 UJ	2500 U	1800 U	3200 U	1900 U
1-NITROPHENOL	2000 U	2200 U	2500 U	1800 U	3200 U	1900 U
CENAPHTHENE	400 U	440 U	490 U	350 U	640 U	380 U
CENAPHTHYLENE	400 U	440 U	490 U	350 U	640 U	380 U
ANTHRACENE	400 U	440 UJ	490 U	350 U	640 U	380 U
ENZIDINE	2000 U	2200 U	2500 UJ	1800 U	3200 U	1900 U
ENZO(A)ANTHRACENE	400 U	440 UJ	490 U	350 U	640 U	380 U
ENZO(A)PYRENE	400 U	440 UJ	490 U	350 U	640 U	380 U
ENZO(B)FLUORANTHENE	400 U	440 UJ	490 U	350 U	640 U	380 U
ENZO(G,H,I)PERYLENE	400 UJ	440 UJ	490 U	350 U	640 U	380 U

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- J - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Sample ID No.	138-MSC-082 83890C005 14 - 16	138-MSC-087 83890C025 10 - 12	138-MSC-093 83890C031 10 - 12	138-MSC-098 83890C030 4 - 6	138-MSC-105 83890C021 6 - 8	138-MSC-106 83890C021 10 - 12
Analyte						
ZO(K)FLUORANTHENE	400 U	440 UJ	490 U	350 U	640 U	380 U
ZOIC ACID	2000 U	2200 U	2500 U	1800 U	3200 U	1900 U
ZYL ALCOHOL	400 U	440 U	490 U	350 U	640 U	380 U
(2-CHLOROETHOXY)METHANE	400 U	440 U	490 U	350 U	640 U	380 U
(2-CHLOROETHYL)ETHER	400 U	440 U	490 U	350 U	640 U	380 U
(2-CHLOROISOPROPYL)ETHER	400 U	440 U	490 U	350 U	640 U	380 U
(2-ETHYLHEXYL)PHTHALATE	230 J	49 UJ	97 J	52 J	110 J	110 J
YL BENZYL PHTHALATE	400 U	440 UJ	490 U	350 U	640 U	380 U
YSENE	400 U	440 UJ	490 U	44 J	640 U	380 U
N-BUTYL PHTHALATE	400 U	440 U	490 U	350 U	66 J	380 U
N-OCTYL PHTHALATE	400 U	440 U	490 U	350 U	640 U	380 U
ENZ(A,H)ANTHRACENE	400 U	440 U	490 U	350 U	640 U	380 U
ENZOFURAN	400 U	440 UJ	490 U	350 U	640 U	380 U
THYL PHTHALATE	400 U	440 UJ	490 U	350 U	640 U	380 U
ETHYL PHTHALATE	400 U	440 U	490 U	51 J	640 U	380 U
ORANTHENE	400 U	440 UJ	490 U	350 U	640 U	380 U
ORENE	400 U	440 UJ	490 U	350 U	640 U	380 U
ACHLORO BENZENE	400 U	440 UJ	490 U	350 U	640 U	380 U
ACHLOROBUTADIENE	400 U	440 U	490 U	350 U	640 U	380 U
ACHLOROCYCLOPENTADIENE	400 U	440 U	490 U	350 U	640 U	380 U
ACHLOROETHANE	400 U	440 U	490 U	350 U	640 U	380 U
ENO(1,2,3-CD)PYRENE	400 UJ	440 UJ	490 U	350 U	640 U	380 U
PHORONE	400 U	440 U	490 U	350 U	640 U	380 U
ITROSO-DI-N-PROPYLAMINE	400 U	440 U	490 U	350 U	640 U	380 U
ITROSODIMETHYLAMINE	400 U	440 U	490 U	350 U	640 U	380 U
ITROSODIPHENYLAMINE	400 U	750 =	490 U	350 U	170 J	380 U
HTHALENE	400 U	440 U	490 U	350 U	640 U	380 U
ROBENZENE	400 U	440 U	490 U	350 U	640 U	380 U
ITACHLOROPHENOL	2000 U	2200 UJ	2500 U	1800 U	3200 U	1900 U
NANTHRENE	400 U	440 UJ	490 U	350 U	640 U	380 U
NOL	400 U	440 U	490 U	350 U	640 U	380 U
ENE	400 U	440 UJ	56 J	59 J	640 U	380 U

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Page 11 of 24

Sample ID No.	138-MSC-113	138-MSC-122	138-MSC-125	138-MSC-127	138-MSC-142
Sample Depth (ft)	83890C012	83890C033	83890C027	83890C027	83890C032
	10 - 12	5 - 7	4 - 6	8 - 10	4 - 6
Analyte					
2,4-TRICHLOROBENZENE	590 UJ	370 UJ	380 U	380 U	370 U
2-DICHLOROBENZENE	590 UJ	370 UJ	380 U	380 U	370 U
2-DIPHENYLHYDRAZINE	590 R	370 UR	380 UR	380 UR	370 UR
3-DICHLOROBENZENE	590 UJ	370 UJ	380 U	380 U	370 U
4-DICHLOROBENZENE	590 UJ	370 UJ	380 U	380 U	370 U
4,5-TRICHLOROPHENOL	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
4,6-TRICHLOROPHENOL	590 UJ	370 UJ	380 U	380 U	370 U
4-DICHLOROPHENOL	590 UJ	370 UJ	380 U	380 U	370 U
4-DIMETHYLPHENOL	590 UJ	370 UJ	380 U	380 U	370 U
4-DINITROPHENOL	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
4-DINITROTOLUENE	590 UJ	370 UJ	380 U	380 U	370 U
6-DINITROTOLUENE	590 UJ	370 UJ	380 U	380 U	370 U
CHLOROPHTHALENE	590 UJ	370 UJ	380 U	380 U	370 U
CHLOROPHENOL	590 UJ	370 UJ	380 U	380 U	370 U
METHYLWAPHTHALENE	590 UJ	370 UJ	380 U	380 U	370 U
METHYLPHENOL	590 UJ	370 UJ	380 U	380 U	370 U
NITROANILINE	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
NITROPHENOL	590 UJ	370 UJ	380 U	380 U	370 U
3'-DICHLOROBENZIDINE	1200 UJ	740 UJ	760 U	760 UJ	740 U
NITROANILINE	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
6-DINITRO-2-METHYLPHENOL	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
BROMOPHENYL-PHENYLETHER	590 UJ	370 UJ	380 U	380 U	370 U
CHLORO-3-METHYLPHENOL	590 UJ	370 UJ	380 U	380 U	370 U
CHLOROANILINE	590 UJ	370 UJ	380 U	380 U	370 U
CHLOROPHENYL-PHENYLETHER	590 UJ	370 UJ	380 U	380 U	370 U
METHYLPHENOL	590 UJ	370 UJ	58 J	380 U	370 U
NITROANILINE	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
NITROPHENOL	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
ENAPHTHENE	590 UJ	370 UJ	380 U	380 U	100 J
ENAPHTHYLENE	590 UJ	370 UJ	380 U	380 U	370 U
THRACENE	590 UJ	370 R	180 J	380 U	400 =
NZIDINE	3000 UJ	1800 UR	1900 UR	1900 UR	1900 UR
NZO(A)ANTHRACENE	590 UJ	370 R	1600 =	380 UJ	810 =
NZO(A)PYRENE	590 UJ	370 R	1200 =	380 UJ	530 =
NZO(B)FLUORANTHENE	590 UJ	370 R	1300 =	380 UJ	600 =
NZO(G,H,I)PERYLENE	590 UJ	370 R	920 =	380 UJ	370 U

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Page 12 of 24

Sample ID No. Well ID No. Sample Depth (ft)	138-MSC-113 83890C012 10 - 12	138-MSC-122 83890C033 5 - 7	138-MSC-125 83890C027 4 - 6	138-MSC-127 83890C027 8 - 10	138-MSC-142 83890C032 4 - 6
Analyte					
ZO(K)FLUORANTHENE	590 UJ	370 R	920 =	380 UJ	550 =
ZOIC ACID	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
ZYL ALCOHOL	590 UJ	370 UJ	380 U	380 U	370 U
(2-CHLOROETHOXY)METHANE	590 UJ	370 UJ	380 U	380 U	370 U
(2-CHLOROETHYL)ETHER	590 UJ	370 UJ	380 U	380 U	370 U
(2-CHLOROISOPROPYL)ETHER	590 UJ	370 UJ	380 U	380 U	370 U
(2-ETHYLHEXYL)PHTHALATE	560 UJ	370 R	380 U	380 UJ	120 J
YL BENZYL PHTHALATE	590 UJ	370 UJ	380 U	380 UJ	370 U
YSENE	590 UJ	370 R	1300 =	380 UJ	710 =
N-BUTYL PHTHALATE	590 UJ	370 UJ	380 U	380 U	370 U
N-OCTYL PHTHALATE	590 UJ	370 UJ	380 U	380 UJ	370 U
ENZ(A,H)ANTHRACENE	590 UJ	370 UJ	440 =	380 UJ	370 U
ENZOFURAN	590 UJ	370 UJ	380 U	380 U	76 J
THYL PHTHALATE	590 UJ	370 UJ	380 U	380 U	370 U
ETHYL PHTHALATE	590 UJ	370 UJ	380 U	380 U	370 U
ORANTHENE	590 UJ	370 R	2300 =	380 U	2600 =
ORENE	590 UJ	370 UJ	380 U	380 U	150 J
ACHLOROBENZENE	590 UJ	370 UJ	380 U	380 U	370 U
ACHLOROBUTADIENE	590 UJ	370 UJ	380 U	380 U	370 U
ACHLOROCYCLOPENTADIENE	590 UJ	370 UJ	380 U	380 U	370 U
ACHLOROETHANE	590 UJ	370 UJ	380 U	380 U	370 U
ENO(1,2,3-CD)PYRENE	590 UJ	370 R	1100 =	380 UJ	370 U
IPHORONE	590 UJ	370 UJ	380 U	380 U	370 U
NITROSO-DI-N-PROPYLAMINE	590 UJ	370 UJ	380 U	380 U	370 U
NITROSODIMETHYLAMINE	590 UJ	370 UJ	380 UR	380 UR	370 UR
NITROSODIPHENYLAMINE	590 UJ	370 UJ	380 U	380 U	370 U
NHTHALENE	590 UJ	370 UJ	380 U	380 U	370 U
ROBENZENE	590 UJ	370 UJ	380 U	380 U	370 U
ITACHLOROPHENOL	3000 UJ	1800 UJ	1900 U	1900 U	1900 U
INANTHRENE	590 UJ	370 R	820 =	380 U	1700 =
INOL	590 UJ	49 J	380 U	380 U	370 U
IENE	590 UJ	370 R	1900 =	380 UJ	1600 =

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Page 13 of 24

Sample ID No.	138-MSC-145	138-MSC-150	138-MSC-167	138-MSC-171	138-MSC-178	138-MSC-180
Corehole ID No.	B3890C010	B3890C028	B3890C017	B3890C018	B3890C014	B3890C026
Sample Depth (ft)	6 - 8	8 - 11	12 - 14	4 - 6	12 - 14	0 - 2
Analyte						
,2,4-TRICHLOROENZENE	380 U	370 U	370 U	380 U	360 U	680 UJ
,2-DICHLOROENZENE	380 U	370 U	370 U	380 U	360 U	680 UJ
,2-DIPHENYLHYOAZINE	1300 =R	370 UR	370 UJ	380 U	360 U	680 UJ
,3-DICHLOROENZENE	380 U	370 U	370 U	380 U	360 U	680 UJ
,4-DICHLOROENZENE	380 U	370 U	370 U	380 U	360 U	680 UJ
,4,5-TRICHLOROPHENOL	1900 U	1900 U	1800 U	1900 U	1800 U	3400 UJ
,4,6-TRICHLOROPHENOL	380 U	370 U	370 U	380 U	360 U	680 UJ
,4-DICHLOROPHENOL	380 U	370 U	370 U	380 U	360 U	680 UJ
,4-DIMETHYLPHENOL	380 U	370 U	370 U	380 U	360 U	680 UJ
,4-DINITROPHENOL	1900 U	1900 U	800 U	1900 U	1800 U	3400 UJ
,4-DINITROTOLUENE	380 U	370 U	370 U	380 U	360 U	680 UJ
,6-DINITROTOLUENE	380 U	370 U	370 U	380 U	360 U	680 UJ
-CHLORONAPHTHALENE	380 U	370 U	370 U	380 U	360 U	680 UJ
-CHLOROPHENOL	380 U	370 U	370 U	380 U	360 U	680 UJ
-METHYLNAPHTHALENE	380 U	370 U	370 U	380 U	360 U	680 UJ
-METHYLPHENOL	380 U	3100 =	370 U	380 U	360 U	680 UJ
-NITROANILINE	1900 U	1900 U	1800 UJ	1900 U	1800 U	3400 UJ
-NITROPHENOL	380 U	370 U	370 U	380 U	360 U	680 UJ
,3'-DICHLOROENZIDINE	770 U	740 U	730 UJ	760 UJ	720 UJ	1400 UJ
-NITROANILINE	1900 U	1900 U	1800 U	1900 U	1800 U	3400 UJ
,6-DINITRO-2-METHYLPHENOL	1900 U	1900 U	1800 U	1900 U	1800 U	3400 UJ
-BROMOPHENYL-PHENYLETHER	380 U	370 U	370 U	380 U	360 U	680 UJ
-CHLORO-3-METHYLPHENOL	380 U	370 U	370 U	380 U	360 U	680 UJ
-CHLOROANILINE	380 U	370 U	370 U	380 U	360 U	680 UJ
-CHLOROPHENYL-PHENYLETHER	380 U	370 U	370 U	380 U	360 U	680 UJ
-METHYLPHENOL	380 U	370 U	370 U	380 U	360 U	680 UJ
-NITROANILINE	1900 U	1900 U	1800 U	1900 U	1800 U	3400 UJ
-NITROPHENOL	1900 U	1900 U	1800 U	1900 U	1800 U	3400 UJ
CENAPHTHENE	380 U	80 J	370 U	380 U	360 U	680 UJ
CENAPHTHYLENE	380 U	47 J	370 U	380 U	360 U	680 UJ
NTHRACENE	380 U	320 J	370 U	380 U	360 U	680 UJ
ENZIDINE	1900 UR	1900 UR	1800 R	1900 R	1800 R	3400 R
ENZO(A)ANTHRACENE	380 U	1400 =	370 U	380 U	360 U	160 J
ENZO(A)PYRENE	380 U	1100 =	370 U	380 U	360 U	100 J
ENZO(B)FLUORANTHENE	380 U	980 =	370 U	380 UJ	360 UJ	140 J
ENZO(G,H,I)PERYLENE	380 U	740 =	370 U	380 U	360 U	680 UJ

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- J - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14

(continued)

p. 14 of 24

Sample ID No. Well ID No. Sample Depth (ft)	138-MSC-145 B3890C010 6 - 8	138-MSC-150 B3890C028 8 - 11	138-MSC-167 B3890C017 12 - 14	138-MSC-171 B3890C018 4 - 6	138-MSC-178 B3890C014 12 - 14	138-MSC-180 B3890C026 0 - 2
Analyte						
ZO(K)FLUORANTHENE	380 U	770 =	370 U	380 U	360 U	100 J
ZOIC ACID	1900 U	1900 U	1800 U	1900 U	1800 U	3400 UJ
ZYL ALCOHOL	380 U	370 U	370 U	380 U	360 U	680 UJ
(2-CHLOROETHOXY)METHANE	380 U	370 U	370 U	380 U	360 U	680 UJ
(2-CHLOROETHYL)ETHER	380 U	370 U	370 U	380 U	360 U	680 UJ
(2-CHLOROISOPROPYL)ETHER	380 U	370 U	370 U	380 U	360 U	680 R
(2-ETHYLHEXYL)PHTHALATE	48 J	140 J	370 R	380 UJ	360 U	680 UJ
YL BENZYL PHTHALATE	380 U	370 U	370 U	380 U	360 U	680 UJ
YSENE	380 U	1100 =	370 U	380 U	360 U	240 J
N-BUTYL PHTHALATE	380 U	370 U	370 U	380 U	360 U	85 J
N-OCTYL PHTHALATE	380 U	370 U	370 U	380 U	360 U	680 UJ
ENZ(A,H)ANTHRACENE	380 U	380 =	370 U	380 UJ	360 U	680 UJ
ENZOFURAN	380 U	51 J	370 U	380 U	360 U	680 UJ
THYL PHTHALATE	380 U	370 U	370 U	380 U	360 U	680 UJ
ETHYL PHTHALATE	380 U	370 U	370 U	380 U	360 U	680 UJ
ORANTHENE	380 U	2900 =	370 U	380 U	360 U	460 J
ORENE	380 U	100 J	370 U	380 U	360 U	680 UJ
ACHLORO BENZENE	380 U	370 U	370 U	380 U	360 U	680 UJ
ACHLORO BUTADIENE	380 U	370 U	370 U	380 U	360 U	680 UJ
ACHLORO CYCLOPENTADIENE	380 U	370 U	370 U	380 U	360 U	680 UJ
ACHLOROETHANE	380 U	370 U	370 U	380 U	360 U	680 UJ
ENO(1,2,3-CD)PYRENE	380 U	850 =	370 U	380 U	360 U	680 UJ
PHORONE	380 U	370 U	370 U	380 U	360 U	680 UJ
ITROSO-DI-N-PROPYLAMINE	380 U	370 U	370 UJ	380 U	360 U	680 UJ
ITROSO DIMETHYLAMINE	380 UR	370 UR	370 U	380 U	360 U	680 UJ
ITROSO DIPHENYLAMINE	380 U	370 U	370 U	380 U	360 U	680 UJ
MTHALENE	380 U	120 J	370 U	380 U	360 U	680 UJ
ROBENZENE	380 U	370 U	370 U	380 U	360 U	680 UJ
TACHLOROPHENOL	1900 U	1900 U	1800 U	1900 U	1800 U	3400 UJ
NANTHRENE	380 U	1500 =	370 U	380 U	360 U	330 J
NOL	380 U	370 U	370 U	380 U	360 U	680 UJ
ENE	380 U	2100 =	370 U	380 U	360 U	430 J

centration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
No data qualifier required.

The analyte is found in the associated blank as well as the sample.
Unreliable result. Analyte may or may not be present in the sample.

Analyte present; reported as an estimated value.

- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Page 15 of 24

Sample ID No.	138-MSC-183	138-MSC-184	138-MSC-196	138-MSC-202	138-MSC-208	138-MSC-215
Corehole ID No.	B3890C026	B3890C012	B3890C016	B3890C009	B3890C011	B3890C029
Sample Depth (ft)	12 - 14	14 - 16	14 - 16	8 - 10	12 - 14	12 - 14
Analyte						
,2,4-TRICHLOROBENZENE	400 U	360 U	370 U	390 U	390 U	470 U
,2-DICHLOROBENZENE	400 U	360 U	370 U	390 U	390 U	470 U
,2-DIPHENYLHYDRAZINE	400 U	360 U	370 UJ	390 U	130 J	470 U
,3-DICHLOROBENZENE	400 U	360 U	370 U	390 U	390 U	470 U
,4-DICHLOROBENZENE	400 U	360 U	370 U	390 U	390 U	470 U
,4,5-TRICHLOROPHENOL	2000 U	1800 U	1800 U	2000 U	2000 U	2300 U
,4,6-TRICHLOROPHENOL	400 U	360 U	370 U	390 U	390 U	470 U
,4-DICHLOROPHENOL	400 U	360 U	370 U	390 U	390 U	470 U
,4-DIMETHYLPHENOL	400 U	360 U	370 U	390 U	390 U	470 U
,4-DINITROPHENOL	2000 U	1800 U	1800 U	2000 U	2000 U	2300 U
,4-DINITROTOLUENE	400 U	360 U	370 U	390 U	390 U	470 U
,6-DINITROTOLUENE	400 U	360 U	370 U	390 U	390 U	470 U
-CHLORONAPHTHALENE	400 U	360 U	370 U	390 U	390 U	470 U
-CHLOROPHENOL	400 U	360 U	370 U	390 U	390 U	470 U
-METHYLNAPHTHALENE	400 U	360 U	370 U	390 U	390 U	470 U
-METHYLPHENOL	400 U	360 U	370 U	390 U	390 U	470 U
-NITROANILINE	2000 U	1800 UJ	1800 UJ	2000 UJ	2000 UJ	2300 U
-NITROPHENOL	400 U	360 U	370 U	390 U	390 U	470 U
,3'-DICHLOROBENZIDINE	800 UJ	720 UJ	740 UJ	780 UJ	780 UJ	940 UJ
-NITROANILINE	2000 U	1800 U	1800 U	2000 U	2000 U	2300 U
,6-DINITRO-2-METHYLPHENOL	2000 U	1800 U	1800 U	2000 U	2000 U	2300 U
-BROMOPHENYL-PHENYLETHER	400 U	360 U	370 U	390 U	390 U	470 U
-CHLORO-3-METHYLPHENOL	400 U	360 U	370 U	390 U	390 U	470 U
-CHLOROANILINE	400 U	360 U	370 U	390 U	390 U	470 U
-CHLOROPHENYL-PHENYLETHER	400 U	360 U	370 U	390 U	390 U	470 U
-METHYLPHENOL	400 U	360 U	370 U	390 U	390 U	470 U
-NITROANILINE	2000 U	1800 U	1800 U	2000 U	2000 U	2300 U
-NITROPHENOL	2000 U	1800 U	1800 U	2000 U	2000 U	2300 U
CENAPHTHENE	400 U	360 U	370 U	390 U	390 U	470 U
CENAPHTHYLENE	400 U	360 U	370 U	51 J	390 U	470 U
YTHRACENE	400 U	360 U	370 U	41 J	390 U	470 U
ENZIDINE	2000 R	1800 R	1800 R	2000 R	2000 R	2300 R
ENZO(A)ANTHRACENE	400 U	360 U	370 U	190 J	390 U	470 U
ENZO(A)PYRENE	400 U	360 U	370 U	200 J	390 U	470 U
ENZO(B)FLUORANTHENE	400 UJ	360 U	370 U	240 J	390 U	470 UJ
ENZO(G,H,I)PERYLENE	400 U	360 U	370 U	160 J	390 U	470 U

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- J - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

6 of 24	138-MS-C-183	138-MS-C-184	138-MS-C-196	138-MS-C-202	138-MS-C-208	138-MS-C-215
ID No.	B3890C026	B3890C012	B3890C016	B3890C009	B3890C011	B3890C029
Core ID No.	12 - 14	14 - 16	14 - 16	8 - 10	12 - 14	12 - 14
Depth (ft)						
Analyte						
1-K)FLUORANTHENE	400 U	360 U	370 U	150 J	390 U	470 U
2-N)FLUORANTHENE	2000 U	83 J	1800 U	2000 U	2000 U	2300 U
3)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
4)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
5)FLUORANTHENE	400 U	360 U	370 U	390 U	390 R	470 U
6)FLUORANTHENE	400 U	360 R	370 R	390 R	390 U	470 U
7)FLUORANTHENE	400 U	360 UJ	370 =	390 UJ	390 U	470 U
8)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
9)FLUORANTHENE	400 U	360 U	370 U	270 J	390 U	470 U
10)FLUORANTHENE	400 U	49 J	74 J	57 J	57 J	470 U
11)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
12)FLUORANTHENE	400 UJ	360 U	370 U	48 J	390 U	470 UJ
13)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
14)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
15)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
16)FLUORANTHENE	400 U	360 U	370 U	440 =	390 U	470 U
17)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
18)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
19)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
20)FLUORANTHENE	400 U	360 UJ	370 U	390 UJ	390 UJ	470 U
21)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
22)FLUORANTHENE	400 U	360 U	370 U	150 J	390 U	470 U
23)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
24)FLUORANTHENE	400 U	360 UJ	370 UJ	390 UJ	390 UJ	470 U
25)FLUORANTHENE	400 U	360 UJ	370 U	390 UJ	390 UJ	470 U
26)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
27)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
28)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	470 U
29)FLUORANTHENE	2000 U	1800 U	110 J	70 J	2000 U	2300 U
30)FLUORANTHENE	400 U	360 U	370 U	240 J	390 U	470 U
31)FLUORANTHENE	400 U	360 U	370 U	390 U	390 U	120 J
32)FLUORANTHENE	400 U	360 U	370 U	320 J	390 U	470 U

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
No data qualifier required.

The analyte is found in the associated blank as well as the sample.
Unreliable result. Analyte may or may not be present in the sample.

Analyte present; reported as an estimated value.

Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14

(continued)

Page 17 of 24

Sample ID No.	138-MSC-223	138-MSC-224	138-MSC-231	138-MSC-239	138-MSC-243
Well ID No.	B3890C001-2	B3890C001-2	B3890C003-2	B3890C003-2	B3890C034
Sample Depth (ft)	4 - 6	10 - 12	0 - 2	15 - 17.5	6 - 8
Analyte					
2,4-TRICHLOROBENZENE	1800 UJ	340 U	400 U	350 U	1900 U
2-DICHLOROBENZENE	1800 UJ	340 U	400 UJ	350 U	1900 U
2-DIPHENYLHYDRAZINE	1800 UJ	340 U	400 U	350 U	1900 U
3-DICHLOROBENZENE	1800 UJ	340 U	400 UJ	350 U	1900 U
4-DICHLOROBENZENE	1800 UJ	340 U	400 UJ	350 U	1900 U
2,5-TRICHLOROPHENOL	9200 UJ	1700 U	2000 UJ	1800 U	9300 U
2,6-TRICHLOROPHENOL	1800 UJ	340 U	400 UJ	350 U	1900 U
3-DICHLOROPHENOL	1800 UJ	340 U	400 U	350 U	1900 U
3-DIMETHYLPHENOL	1800 UJ	340 U	400 U	350 U	1900 U
3-DINITROPHENOL	9200 UJ	1700 U	2000 UJ	1800 UJ	9300 U
3-DINITROTOLUENE	1800 UJ	340 U	400 UJ	350 U	1900 U
4-DINITROTOLUENE	1800 UJ	340 U	400 UJ	350 U	1900 U
1-CHLORONAPHTHALENE	1800 UJ	340 U	400 UJ	350 U	1900 U
2-CHLOROPHENOL	1800 UJ	340 U	400 UJ	350 U	1900 U
1-METHYLNAPHTHALENE	1800 UJ	340 U	400 U	350 U	1900 U
2-METHYLPHENOL	1800 UJ	340 U	400 UJ	350 U	1900 U
4-NITROANILINE	9200 UJ	1700 U	2000 UJ	1800 U	9300 U
3-NITROPHENOL	1800 UJ	340 U	400 U	350 U	1900 U
1,4-DICHLOROBENZIDINE	3700 UJ	670 UJ	790 UJ	700 UJ	3700 U
4-NITROANILINE	9200 UJ	1700 U	2000 UJ	1800 U	9300 U
3-DINITRO-2-METHYLPHENOL	9200 UJ	1700 U	2000 UJ	1800 U	9300 U
4-NITROPHENYL-PHENYLETHER	1800 UJ	340 U	400 UJ	350 U	1900 U
2-CHLORO-3-METHYLPHENOL	1800 UJ	340 U	400 U	350 U	1900 U
2-CHLOROANILINE	1800 UJ	340 U	400 U	350 U	1900 U
2-CHLOROPHENYL-PHENYLETHER	1800 UJ	340 U	400 UJ	350 U	1900 U
3-METHYLPHENOL	1800 UJ	340 U	400 UJ	350 U	1900 U
4-NITROANILINE	9200 UJ	1700 U	2000 UJ	1800 U	9300 U
3-NITROPHENOL	9200 UJ	1700 U	2000 U	1800 U	9300 U
1-NAPHTHENE	1800 UJ	340 U	400 UJ	350 U	1900 U
2-NAPHTHYLENE	1800 UJ	340 U	400 UJ	350 U	1900 U
1-ACENAPHTHENE	1800 R	340 U	58 J	350 U	1900 U
INDOLE	9200 UJ	1700 UR	2000 U	1800 R	9300 UR
1-ANTHRACENE	7000 R	340 UJ	300 J	350 U	1900 U
1-PYRENE	1800 R	340 UJ	280 J	350 U	1900 U
2-FLUORANTHENE	1800 R	340 UJ	250 J	350 U	1900 U
1-PERYLENE	1800 R	340 UJ	210 J	350 U	1900 U

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

No data qualifier required.

The analyte is found in the associated blank as well as the sample.

Unreliable result. Analyte may or may not be present in the sample.

Analyte present; reported as an estimated value.

- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

18 of 24

Sample ID No.	138-MSC-223 B3890C001-2 4 - 6	138-MSC-224 B3890C001-2 10 - 12	138-MSC-231 B3890C003-2 0 - 2	138-MSC-239 B3890C003-2 15 - 17.5	138-MSC-243 B3890C034 6 - 8
Analyte					
1,2,3,4-DIBENZO(K)FLUORANTHENE	1800 RJ	340 UJ	210 J	350 U	1900 U
ACETIC ACID	9200 UJ	1700 U	2000 UJ	1800 U	9300 U
1-PHENOL	1800 UJ	340 U	400 UJ	350 U	1900 U
1,2-DICHLOROETHOXYMETHANE	1800 UJ	340 U	400 U	350 U	1900 U
1,2-DICHLOROETHYLENE	1800 UJ	340 U	400 UJ	350 U	1900 U
1,2-DICHLOROISOPROPYLENE	1800 UJ	340 U	400 UJ	350 U	1900 U
1,2-DIBENZYLPHthalate	1800 RJ	340 UJ	150 J	280 J	1900 U
1,4-DIBENZYLPHthalate	1800 UJ	340 UJ	400 UJ	350 UJ	1900 U
1,4-DIBENZO	7200 RJ	340 UJ	380 J	350 U	1900 U
1,4-DIBUTYLPHthalate	1800 UJ	100 J	120 J	52 J	1900 U
1,4-DIOCTYLPHthalate	1800 UJ	340 UJ	400 UJ	350 UJ	1900 U
1,5-DIBENZ(A,H)ANTHRACENE	1800 UJ	340 UJ	52 J	350 UJ	1900 U
1,5-DIOFURAN	1800 UJ	340 U	400 UJ	350 U	1900 U
1,5-DIETHYLPHthalate	1800 UJ	340 U	400 UJ	350 U	1900 U
1,5-DIETHYLPHthalate	1800 UJ	340 U	400 UJ	350 U	1900 U
1,5-DIBENZ(A)ANTHRENE	27000 RJ	340 U	570 J	350 U	1900 U
1,5-DIBENZO	1800 UJ	340 U	400 UJ	350 U	1900 U
1,5-DICHLOROBENZENE	1800 UJ	340 U	400 UJ	350 U	1900 U
1,5-DICHLOROBUTADIENE	1800 UJ	340 U	400 U	350 U	1900 U
1,5-DICHLOROCYCLOPENTADIENE	1800 UJ	340 U	400 UJ	350 UJ	1900 U
1,5-DICHLOROETHANE	1800 UJ	340 U	400 UJ	350 U	1900 U
1,5-DIO(1,2,3-CD)PYRENE	1800 RJ	340 UJ	190 J	350 U	1900 U
1,5-DIORONE	1800 UJ	340 U	400 U	350 U	1900 U
1,5-DIROSODI-N-PROPYLAMINE	1800 UJ	340 U	400 UJ	350 U	1900 U
1,5-DIROSODIMETHYLAMINE	1800 UJ	340 U	400 U	350 U	1900 U
1,5-DIROSODIPHENYLAMINE	1800 UJ	340 U	400 UJ	350 U	2100 *
1,5-DIHALOETHANE	1800 UJ	340 U	400 U	350 U	1900 U
1,5-DIBENZENE	1800 UJ	340 U	400 U	350 U	1900 U
1,5-DICHLOROPHENOL	9200 UJ	1700 U	81 J	1800 U	9300 U
1,5-DIANTHRENE	12000 RJ	340 U	290 J	350 U	1900 U
1,5-DIETHYL	1800 UJ	340 U	400 UJ	350 U	1900 U
1,5-DIETHYL	13000 RJ	37 J	410 J	350 U	1900 U

Concentration Units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported. No data qualifier required.

The analyte is found in the associated blank as well as the sample.

Unreliable result. Analyte may or may not be present in the sample.

Analyte present; reported as an estimated value.

Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Sample ID No. Well ID No. Sample Depth (ft)	138-MSC-272 B3890C013 12 - 14	138-MSC-274 B3890C008-1 0 - 2	138-MSC-280 B3890C020 0 - 2	138-MSC-284 B3890C020 8 - 10
Analyte				
1,4-TRICHLOROBENZENE	360 U	350 U	1800 U	360 U
1,2-DICHLOROBENZENE	360 U	350 U	1800 U	360 U
1,4-DIPHENYLHYDRAZINE	360 U	350 U	1800 U	360 U
1,2-DICHLOROBENZENE	360 U	350 U	1800 U	360 U
1,3-DICHLOROBENZENE	360 U	350 U	1800 U	360 U
1,5-TRICHLOROPHENOL	1800 U	1700 U	8800 U	1800 U
1,6-TRICHLOROPHENOL	360 U	350 U	1800 U	360 U
1,2-DICHLOROPHENOL	360 U	350 U	1800 U	360 U
1,4-DIMETHYLPHENOL	360 U	350 U	1800 U	360 U
1,3-DINITROPHENOL	1800 U	1700 U	8800 U	1800 U
1,4-DINITROTOLUENE	360 U	350 U	1800 U	360 U
1,3-DINITROTOLUENE	360 U	350 U	1800 U	360 U
1-CHLORONAPHTHALENE	360 U	350 U	1800 U	360 U
1-CHLOROPHENOL	360 U	350 U	1800 U	360 U
1-METHYLNAPHTHALENE	360 U	350 U	1800 U	360 U
1-METHYLPHENOL	360 U	350 U	1800 U	360 U
1-NITROANILINE	1800 U	1700 U	8800 U	1800 U
1-NITROPHENOL	360 U	350 U	1800 U	360 U
1,1'-DICHLOROBENZIDINE	730 U	700 U	3500 U	730 U
1-NITROANILINE	1800 U	1700 U	8800 U	1800 U
1,5-DINITRO-2-METHYLPHENOL	1800 U	1700 U	8800 U	1800 U
1-BROMOPHENYL-PHENYLETHER	360 U	350 U	1800 U	360 U
1-CHLORO-3-METHYLPHENOL	360 U	350 U	1800 U	360 U
1-CHLOROANILINE	360 U	350 U	1800 U	360 U
1-CHLOROPHENYL-PHENYLETHER	360 U	350 U	1800 U	360 U
1-METHYLPHENOL	360 U	350 U	1800 U	360 U
1-NITROANILINE	1800 U	1700 U	8800 U	1800 U
1-NITROPHENOL	120 J	1700 U	8800 U	1800 U
1-NAPHTHENE	360 U	350 U	1800 U	360 U
1-NAPHTHYLENE	360 U	350 U	1800 U	360 U
1-THRACENE	360 U	350 U	1800 U	360 U
1-QUINOLINE	1800 U	1700 U	8800 U	1800 U
1-QUINO(LINE)ANTHRACENE	360 U	350 U	480 J	360 U
1-QUINO(LINE)PYRENE	360 U	350 U	320 J	360 U
1-QUINO(LINE)FLUORANTHENE	360 U	350 U	380 J	360 U
1-QUINO(LINE,G,H,I)PERYLENE	360 U	350 U	1800 U	360 U

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

1 of 24

ID No.	138-MS-272		138-MS-274		138-MS-280		138-MS-284
Sample ID No.	B3890C013		B3890C008-1		B3890C020		B3890C020
Depth (ft)	12 - 14		0 - 2		0 - 2		8 - 10
Analyte							
FLUORANTHENE	360 U		350 U		400 J		360 U
ACID	1800 U		200 J		8800 U		1800 U
ALCOHOL	360 U		350 U		1800 U		360 U
CHLOROETHOXYMETHANE	360 U		350 U		1800 U		360 U
CHLOROETHYLETHYETHER	360 U		350 U		1800 U		360 U
CHLORODISOPROPYLETHYETHER	360 U		350 U		1800 U		360 U
ETHYLHEXYLPHthalate	360 U		590 =		1800 U		360 U
DIBENZYLPHthalate	360 U		350 U		1800 U		360 U
DIBENZO	360 U		350 U		590 J		360 U
DIBENZYLPHthalate	2600 B		1500 B		180 JB		2800 B
DIBENZYLPHthalate	360 U		350 U		1800 U		360 U
(A,H)ANTHRACENE	360 U		350 U		1800 U		360 U
FURAN	360 U		350 U		1800 U		360 U
PHthalate	360 U		350 U		1800 U		360 U
PHthalate	360 U		350 U		1800 U		360 U
THENE	360 U		350 U		870 J		360 U
ROBENZENE	360 U		350 U		1800 U		360 U
ROBUTADIENE	360 U		350 U		1800 U		360 U
ROCYCLOPENTADIENE	360 U		350 U		1800 U		360 U
ROETHANE	360 U		350 U		1800 U		360 U
(1,2,3-CD)PYRENE	360 U		350 U		1800 U		360 U
ROME	360 U		350 U		1800 U		360 U
ISO-DI-N-PROPYLAMINE	360 U		350 U		1800 U		360 U
DODIMETHYLAMINE	360 U		350 U		1800 U		360 U
DODIPHENYLAMINE	360 U		350 U		1800 U		360 U
OLENE	360 U		350 U		1800 U		360 U
ENZENE	360 U		350 U		1800 U		360 U
CHLOROPHENOL	120 J		1700 U		8800 U		1800 U
THRENE	360 U		350 U		580 J		360 U
	360 U		350 U		1800 U		360 U
	36 J		350 U		620 J		360 U

Concentration Units - µg/kg - micrograms per kilogram.

U = analyte was not detected. The minimum quantitation limit for the sample is reported.

J = data qualifier required.

= = analyte is found in the associated blank as well as the sample.

0 = unreliable result. Analyte may or may not be present in the sample.

1 = analyte present; reported as an estimated value.

2 = analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14

(continued)

Page 21 of 24

Sample ID No.	138-MSC-289	138-MSC-291	138-MSC-308	138-MSC-314	138-MSC-320	138-MSC-324
Corehole ID No.	B3890C019	B3890C008-1	B3890C006-2	B3890C022-3	B3890C015-1	B3890C028-1
Sample Depth (ft)	6 - 8	14 - 16	6 - 8	14 - 16	12 - 14	6 - 8
Analyte						
,2,4-TRICHLOROBENZENE	480 U	350 U	560 U	400 U	380 U	1800 U
,2-DICHLOROBENZENE	480 U	350 U	560 U	400 U	380 U	1800 U
,2-DIPHENYLHYDRAZINE	480 U	350 U	2700 =	400 U	380 U	1800 U
,3-DICHLOROBENZENE	480 U	350 U	560 U	400 U	380 U	1800 U
,4-DICHLOROBENZENE	480 U	350 U	560 U	400 U	380 U	1800 U
,4,5-TRICHLOROPHENOL	2400 U	1800 U	2800 U	2000 U	1900 U	8800 U
,4,6-TRICHLOROPHENOL	480 U	350 U	560 U	400 U	380 U	1800 U
,4-DICHLOROPHENOL	480 U	350 U	560 U	400 U	380 U	1800 U
,4-DIMETHYLPHENOL	480 U	350 U	560 U	400 U	380 U	1800 U
,4-DINITROPHENOL	2400 U	1800 U	2800 U	2000 U	1900 U	8800 U
,4-DINITROTOLUENE	480 U	350 U	560 U	400 U	380 U	1800 U
,6-DINITROTOLUENE	480 U	350 U	560 U	400 U	380 U	1800 U
-CHLORONAPHTHALENE	480 U	350 U	560 U	400 U	380 U	1800 U
-CHLOROPHENOL	480 U	350 U	560 U	400 U	380 U	1800 U
-METHYLNAPHTHALENE	480 U	350 U	560 U	400 U	380 U	1800 U
-METHYLPHENOL	480 U	350 U	560 U	400 U	380 U	1400 J
-NITROANILINE	2400 U	1800 U	2800 U	2000 U	1900 U	8800 U
-NITROPHENOL	480 U	350 U	560 U	400 U	380 U	1800 U
,3'-DICHLOROBENZIDINE	950 U	710 U	1400 UJ	800 U	760 U	3500 U
-NITROANILINE	2400 U	1800 U	3500 U	2000 U	1900 U	8800 U
,6-DINITRO-2-METHYLPHENOL	2400 U	1800 U	3500 U	2000 U	1900 U	8800 U
-BROMOPHENYL-PHENYLETHER	480 U	350 U	690 U	400 U	380 U	1800 U
-CHLORO-3-METHYLPHENOL	480 U	350 U	690 UJ	400 U	380 U	1800 U
-CHLOROANILINE	480 U	350 U	690 UJ	400 U	380 U	1800 U
-CHLOROPHENYL-PHENYLETHER	480 U	350 U	690 U	400 U	380 U	1800 U
-METHYLPHENOL	480 U	350 U	210 J	400 U	380 U	1800 U
-NITROANILINE	2400 U	1800 U	3500 U	2000 UJ	1900 U	8800 U
-NITROPHENOL	520 J	1800 U	3500 U	2000 U	1900 U	8800 U
CENAPHTHENE	480 U	350 U	690 U	400 U	380 U	930 J
CENAPHTHYLENE	480 U	350 U	690 U	400 U	380 U	1800 U
ANTHRACENE	480 UJ	350 U	690 U	400 U	380 U	2600 =
ENZIDINE	2400 U	1800 U	3500 R	2000 R	1900 U	8800 U
ENZO(A)ANTHRACENE	63 J	350 U	320 J	110 J	380 U	7300 =
ENZO(A)PYRENE	480 U	350 U	390 J	73 J	380 U	5000 J
ENZO(B)FLUORANTHENE	55 J	350 U	360 J	77 J	380 U	4900 J
ENZO(G,H,I)PERYLENE	480 U	350 U	400 J	400 U	380 U	2900 J

Concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- J - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Sample ID No.	138-MSC-329	138-MSC-330	138-MSC-334	138-MSC-336	138-MSC-338	138-MSC-339
Well ID No.	B3890C024-2	B3890C024-2	B3890C030-1	B3890C030-2	B3890C010-1	B3890C010-1
Sample Depth (ft)	6 - 8	10 - 14	4 - 6	10 - 14	0 - 2	4 - 8
Analyte						
1,2,4-TRICHLOROBENZENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1,2-DICHLOROBENZENE	520 U	380 UJ	410 U	360 U	320 U	380 UJ
1,2-DIPHENYLHYDRAZINE	57 J	380 UJ	5700 J	360 UJ	840 J	44 J
1,3-DICHLOROBENZENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1,4-DICHLOROBENZENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1,4,5-TRICHLOROPHENOL	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
1,4,6-TRICHLOROPHENOL	520 U	380 UJ	410 U	360 U	320 U	370 U
1,4-DICHLOROPHENOL	520 U	380 UJ	410 U	360 U	320 U	370 U
1,4-DIMETHYLPHENOL	520 U	380 UJ	410 U	360 U	320 U	370 U
1,4-DINITROPHENOL	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
1,4-DINITROTOLUENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1,6-DINITROTOLUENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1-CHLORONAPHTHALENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1-CHLOROPHENOL	520 U	380 UJ	410 U	360 U	320 U	370 U
1-METHYLNAPHTHALENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1-METHYLPHENOL	520 U	380 UJ	410 U	47 J	320 U	370 U
1-NITROANILINE	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
1-NITROPHENOL	520 U	380 UJ	410 U	360 U	320 U	370 U
1,3'-DICHLOROENZIDINE	1000 U	760 UJ	820 U	730 U	640 U	730 U
1-NITROANILINE	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
1,6-DINITRO-2-METHYLPHENOL	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
1-BROMOPHENYL-PHENYLETHER	520 U	380 UJ	410 U	360 U	320 U	370 U
1-CHLORO-3-METHYLPHENOL	520 U	380 UJ	410 U	360 U	320 U	370 U
1-CHLOROANILINE	520 U	380 UJ	410 U	360 U	320 U	370 U
1-CHLOROPHENYL-PHENYLETHER	520 U	380 UJ	410 U	360 U	320 U	370 U
1-METHYLPHENOL	520 U	380 UJ	410 U	360 U	320 U	370 U
1-NITROANILINE	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
1-NITROPHENOL	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
1-CENAPHTHENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1-CENAPHTHYLENE	520 U	380 UJ	410 U	360 U	320 U	370 U
1-NTHRACENE	520 U	380 UJ	410 U	49 J	270 J	370 U
1-ENZIDINE	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
1-ENZO(A)ANTHRACENE	520 U	380 UJ	410 U	95 J	1100 =	51 J
1-ENZO(A)PYRENE	520 U	380 UJ	410 U	74 J	1000 =	44 J
1-ENZO(B)FLUORANTHENE	520 U	380 UJ	410 U	67 J	1100 =	50 J
1-ENZO(G,H,I)PERYLENE	520 U	380 UJ	410 U	360 U	420 =	370 U

concentration Units - µg/kg - micrograms per kilogram.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- No data qualifier required.
- The analyte is found in the associated blank as well as the sample.
- Unreliable result. Analyte may or may not be present in the sample.
- Analyte present; reported as an estimated value.
- U - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-14
(continued)

Page 24 of 24

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-329 B3890C024-2 6 - 8	138-MSC-330 B3890C024-2 10 - 14	138-MSC-334 B3890C030-1 4 - 6	138-MSC-336 B3890C030-2 10 - 14	138-MSC-338 B3890C010-1 0 - 2	138-MSC-339 B3890C010-1 4 - 8
Analyte						
BENZO(K)FLUORANTHENE	520 U	380 UJ	410 U	67 J	1100 =	40 J
BENZOIC ACID	2600 U	1900 UJ	2100 U	1800 U	1600 U	1800 U
BENZYL ALCOHOL	520 U	380 UJ	410 U	360 U	320 U	370 U
BIS(2-CHLOROETHOXY)METHANE	520 U	380 UJ	410 U	360 U	320 U	370 U
BIS(2-CHLOROETHYL)ETHER	520 U	380 UJ	410 U	360 U	320 U	370 U
BIS(2-CHLOROISOPROPYL)ETHER	520 U	380 UJ	410 U	360 U	320 U	370 U
BIS(2-ETHYLHEXYL)PHTHALATE	210 J	94 J	43 J	120 J	92 J	58 J
BUTYLBENZYLPHTHALATE	520 U	380 UJ	410 U	360 U	320 U	370 U
CHRYSENE	520 U	380 UJ	410 U	100 J	1200 =	61 J
DI-N-BUTYLPHTHALATE	520 U	380 UJ	160 J	360 U	40 J	370 U
DI-N-OCTYLPHTHALATE	520 U	380 UJ	410 U	360 U	320 U	370 U
DIBENZ(A,H)ANTHRACENE	520 U	380 UJ	410 U	360 U	100 J	370 U
DIBENZOFURAN	520 U	380 UJ	410 U	360 U	45 J	370 U
DIETHYLPHTHALATE	520 U	380 UJ	410 U	360 U	320 U	370 U
DIMETHYLPHTHALATE	520 U	380 UJ	410 U	360 U	320 U	370 U
FLUORANTHENE	520 U	380 UJ	410 U	170 J	2200 =	95 J
FLUORENE	520 U	380 UJ	410 U	360 U	94 J	370 U
HEXACHLOROBENZENE	520 U	380 UJ	410 U	360 U	320 U	370 U
HEXACHLOROBUTADIENE	520 U	380 UJ	410 U	360 U	320 U	370 U
HEXACHLOROCYCLOPENTADIENE	520 U	380 UJ	410 U	360 U	320 U	370 U
HEXACHLOROETHANE	520 U	380 UJ	410 U	360 U	320 U	370 U
INDENO(1,2,3-CD)PYRENE	520 U	380 UJ	410 U	360 U	380 =	370 U
ISOPHORONE	520 U	380 UJ	410 U	360 U	320 U	370 U
N-NITROSO-DI-N-PROPYLAMINE	520 U	380 UJ	410 U	360 U	320 U	370 U
N-NITROSODIMETHYLAMINE	520 U	380 UJ	410 U	360 U	320 U	370 U
N-NITROSODIPHENYLAMINE	520 U	380 UJ	410 U	360 U	78 J	370 U
NAPHTHALENE	520 U	380 UJ	410 U	360 U	34 J	370 U
NITROBENZENE	520 U	380 UJ	410 U	360 U	320 U	370 U
PENTACHLOROPHENOL	2600 U	1900 UJ	2100 U	44 J	1600 U	1800 U
PHENANTHRENE	520 U	380 UJ	410 U	190 J	1100 =	76 J
PHENOL	520 U	380 UJ	410 U	360 U	73 J	370 U
PYRENE	520 U	380 UJ	410 U	170 J	1700 =	97 J

Concentration Units - µg/kg - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- = - No data qualifier required.
- B - The analyte is found in the associated blank as well as the sample.
- R - Unreliable result. Analyte may or may not be present in the sample.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table D-15
PCBs,
MISS Onsite Soil Samples

Page 1 of 7

Sample ID No.	138-MSC-025	138-MSC-028	138-MSC-047	138-MSC-066	138-MSC-074	138-MSC-076
Borehole ID No.	B3890C002	B3890C022	B3890C004	B3890C023	B3890C007	B3890C024
Sample Depth (ft)	0 - 8	4 - 6	0 - 10	0 - 8	14 - 16	0 - 8
Analyte						
AROCLOR-1016	46 UJ	56 UJ	50 UJ	48 UJ	48 UJ	57 U
AROCLOR-1221	46 UJ	56 UJ	50 UJ	48 UJ	48 UJ	57 U
AROCLOR-1232	46 UJ	56 UJ	50 UJ	48 UJ	48 UJ	57 U
AROCLOR-1242	46 UJ	56 UJ	50 UJ	48 UJ	48 UJ	57 U
AROCLOR-1248	46 UJ	56 UJ	50 UJ	48 UJ	48 UJ	57 U
AROCLOR-1254	93 UJ	110 UJ	100 UJ	96 UJ	96 UJ	110 U
AROCLOR-1260	93 UJ	110 UJ	100 UJ	96 UJ	96 UJ	110 U

Concentration Units - µg/kg - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- I - Indicates interference.
- = - No data qualifier required.

Table D-15
(continued)

Page 2 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-078 B3890C024 10 - 12	138-MSC-081 B3890C005 4 - 6	138-MSC-086 B3890C025 0 - 8	138-MSC-094 B3890C031 12 - 14	138-MSC-095 B3890C031 0 - 10	138-MSC-100 B3890C030 10 - 12
Analyte						
AROCLOR-1016	44 UJ	54 U	67 U	46 UJ	55 U	43 UJ
AROCLOR-1221	44 UJ	54 U	67 U	46 UJ	55 U	43 UJ
AROCLOR-1232	44 UJ	54 U	67 U	46 UJ	55 U	43 UJ
AROCLOR-1242	44 UJ	54 U	67 U	46 UJ	55 U	43 UJ
AROCLOR-1248	44 UJ	54 U	67 U	46 UJ	55 U	43 UJ
AROCLOR-1254	87 UJ	110 U	130 U	93 UJ	110 U	85 UJ
AROCLOR-1260	87 UJ	110 U	130 U	93 UJ	110 U	85 UJ

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- I - Indicates interference.
- = - No data qualifier required.

Table D-15
(continued)

Page 3 of 7

Sample ID No.	138-MSC-101 83890C030	138-MSC-107 83890C021	138-MSC-116 83890C012	138-MSC-126 83890C027	138-MSC-133 83890C015	138-MSC-134 83890C033
Borehole ID No.						
Sample Depth (ft)	0 - 8	0 - 8	0 - 13.5	0 - 7	10 - 12	0 - 2
Analyte						
AROCLOR-1016	57 U	45 U	540 U	48 U	69 U	46 U
AROCLOR-1221	57 U	45 U	540 U	48 U	69 U	46 U
AROCLOR-1232	57 U	45 U	540 U	48 U	69 U	46 U
AROCLOR-1242	57 U	45 U	540 U	48 U	69 U	46 U
AROCLOR-1248	57 U	45 U	540 U	48 U	69 U	46 U
AROCLOR-1254	110 U	90 U	1100 U	110 =	140 U	92 U
AROCLOR-1260	110 U	90 U	1100 U	96 U	140 U	92 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- I - Indicates interference.
- = - No data qualifier required.

Table D-15
(continued)

Page 4 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-143 B3890C032 0 - 3	138-MSC-151 B3890C028 0 - 8	138-MSC-168 B3890C017 0 - 9	138-MSC-172 B3890C018 0 - 2.5	138-MSC-179 B3890C014 0 - 10
Analyte					
AROCLOR-1016	45 UJ	420 UJ	43 U	45 U	63 U
AROCLOR-1221	45 UJ	420 UJ	43 U	45 U	63 U
AROCLOR-1232	45 UJ	420 UJ	43 U	45 U	63 U
AROCLOR-1242	45 UJ	420 UJ	43 U	45 U	63 U
AROCLOR-1248	45 UJ	420 UJ	43 U	45 U	130 U
AROCLOR-1254	91 UJ	840 UJ	86 U	89 U	130 U
AROCLOR-1260	91 UJ	840 UJ	86 U	89 U	

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- I - Indicates interference.
- = - No data qualifier required.

Table D-15
(continued)

Page 5 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-182 B3890C032 0 - 8	138-MSC-197 B3890C016 0 - 12	138-MSC-203 B3890C009 0 - 8	138-MSC-207 B3890C011 0 - 6.5	138-MSC-225 B3890C001-2 0 - 8
Analyte					
AROCLOR-1016	83 U	64 U	450 U	54 U	43 U
AROCLOR-1221	83 U	64 U	450 U	54 U	43 U
AROCLOR-1232	83 U	64 U	450 U	54 U	43 U
AROCLOR-1242	83 U	64 U	450 U	54 U	43 U
AROCLOR-1248	83 U	64 U	450 U	54 U	43 U
AROCLOR-1254	170 U	130 U	900 U	110 U	85 U
AROCLOR-1260	170 U	130 U	1100 I	110 U	85 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- I - Indicates interference.
- = - No data qualifier required.

Table D-15
(continued)

Page 6 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-238 B3890C003-2 0 - 12	138-MSC-244 B3890C034 0 - 4	138-MSC-285 B3890C020 0 - 4.5	138-MSC-290 B3890C019 0 - 4.5	138-MSC-292 B3890C008-1 0 - 12	138-MSC-306 B3890C0006-2 2 - 4
Analyte						
AROCLOR-1016	47 U	56 U	63 U	52 U	43 U	270 UJ
AROCLOR-1221	47 U	56 U	63 U	52 U	43 U	270 UJ
AROCLOR-1232	47 U	56 U	63 U	52 U	43 U	270 UJ
AROCLOR-1242	47 U	56 U	63 U	52 U	43 U	270 UJ
AROCLOR-1248	47 U	56 U	63 U	52 U	43 U	270 UJ
AROCLOR-1254	95 U	110 U	130 U	100 U	85 U	530 UJ
AROCLOR-1260	95 U	110 U	130 U	100 U	85 U	530 UJ

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- I - Indicates interference.
- = - No data qualifier required.

Table D-15
(continued)

Page 7 of 7

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-325 B3890C028-1 0 - 8	138-MSC-331 B3890C024-2 0 - 8	138-MSC-337 B3890C030-2 0 - 8	138-MSC-340 B3890C010-1 0 - 2
Analyte				
AROCLOR-1016	400 U	57 U	55 UJ	470 U
AROCLOR-1221	400 U	57 U	55 UJ	470 U
AROCLOR-1232	400 U	57 U	55 UJ	470 U
AROCLOR-1242	400 U	57 U	55 UJ	470 U
AROCLOR-1248	400 U	57 U	55 UJ	470 U
AROCLOR-1254	790 U	110 U	110 UJ	950 U
AROCLOR-1260	790 U	110 U	110 UJ	950 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- I - Indicates interference.
- = - No data qualifier required.

Table D-16
Pesticides/PCBs,
MISS Onsite Soil Samples

of 12	138-MSC-003		138-MSC-005		138-MSC-006		138-MSC-007		138-MSC-008		138-MSC-012	
ID No.	B3890C001		B3890C001		B3890C001		B3890C001-1		B3890C003		B3890C003-1	
Site ID No.	4 - 6		10 - 12		0 - 10		4 - 6		0 - 2		10 - 12	
Depth (ft)												
ANALYTE												
DOD	17	U	20	UJ	18	U	18	U	18	U	19	U
DDE	17	U	20	UJ	18	U	18	U	18	U	19	U
DDT	14	J	20	UJ	18	U	18	U	18	U	19	U
DIN	8.5	U	9.9	UJ	8.9	U	9.2	U	9.2	U	9.3	U
DINCHLORDANE	85	U	99	UJ	89	U	92	U	92	U	93	U
-DHC	8.5	U	9.9	UJ	8.9	U	9.2	U	9.2	U	9.3	U
OR-1016	85	U	99	UJ	89	U	92	U	92	U	93	U
OR-1221	85	U	99	UJ	89	U	92	U	92	U	93	U
OR-1232	85	U	99	UJ	89	U	92	U	92	U	93	U
OR-1242	85	U	99	UJ	89	U	92	U	92	U	93	U
OR-1248	85	U	99	UJ	89	U	92	U	92	U	93	U
OR-1254	170	U	200	UJ	180	U	180	U	180	U	190	U
OR-1260	170	U	200	UJ	180	U	180	U	180	U	190	U
BHC	8.5	U	9.9	UJ	8.9	U	9.2	U	9.2	U	9.3	U
-BHC	8.5	U	9.9	UJ	8.9	U	9.2	U	9.2	U	9.3	U
RIN	17	U	20	UJ	18	U	18	U	18	U	19	U
ULFAN I	8.5	U	9.9	UJ	8.9	U	9.2	U	9.2	U	9.3	U
ULFAN II	17	U	20	UJ	18	U	18	U	18	U	19	U
ULFAN SULFATE	17	U	20	UJ	18	U	18	U	18	U	19	U
M	17	U	20	UJ	18	U	18	U	18	U	19	U
N ALDEHYDE	17	U	20	UJ	18	U	18	U	18	U	19	U
N KETONE	17	U	20	UJ	18	U	18	U	18	U	19	U
DINCHLORDANE	85	U	99	UJ	89	U	92	U	92	U	93	U
-DHC (LINDANE)	8.5	U	9.9	UJ	8.9	U	9.2	U	9.2	U	9.3	U
DINCHLOR	8.5	U	9.9	UJ	8.9	U	9.2	U	9.2	U	9.3	U
DINCHLOR EPOXIDE	8.5	U	9.9	UJ	8.9	U	9.2	U	9.2	U	9.3	U
DINCHLOR	85	U	99	UJ	89	U	92	U	92	U	93	U
DINCHLOR	170	U	200	UJ	180	U	180	U	180	U	190	U

Concentration units - µg/kg - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

UJ - Unreliable result. Analyte may or may not be present in the sample.

UJ - No data qualifier required.

Table D-16
(continued)

Sample ID No. Core ID No. Sample Depth (ft)	138-MSC-013 B3890C003-1 0 - 10	138-MSC-021 B3890C002 4 - 6	138-MSC-024 B3890C002 10 - 12	138-MSC-028 B3890C022 4 - 6	138-MSC-031 B3890C022-1 8 - 10
LYTE					
DDD	18 U	22 UJ	18 UJ	20 UJ	18 UJ
DDE	18 U	22 UJ	18 UJ	20 UJ	18 UJ
DDT	18 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
DIBENZOPHANTHENE	8.8 U	110 UJ	90 UJ	99 UJ	89 UJ
γ-CHLORDANE	88 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
γ-BHC	8.8 U	110 UJ	90 UJ	99 UJ	89 UJ
α-OR-1016	88 U	110 UJ	90 UJ	99 UJ	89 UJ
α-OR-1221	88 U	110 UJ	90 UJ	99 UJ	89 UJ
α-OR-1232	88 U	110 UJ	90 UJ	99 UJ	89 UJ
α-OR-1242	88 U	110 UJ	90 UJ	99 UJ	89 UJ
α-OR-1248	88 U	110 UJ	90 UJ	99 UJ	89 UJ
α-OR-1254	180 U	220 UJ	180 UJ	200 UJ	180 UJ
α-OR-1260	180 U	220 UJ	180 UJ	200 UJ	180 UJ
β-BHC	8.8 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
α-BHC	8.8 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
γ-BHC	8.8 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
DRIN	18 U	22 UJ	18 UJ	20 UJ	18 UJ
SULFAN I	8.8 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
SULFAN II	18 U	22 UJ	18 UJ	20 UJ	18 UJ
SULFAN SULFATE	18 U	22 UJ	18 UJ	20 UJ	18 UJ
IN	18 U	22 UJ	18 UJ	20 UJ	18 UJ
IN ALDEHYDE	18 U	22 UJ	18 UJ	20 UJ	18 UJ
IN KETONE	18 U	22 UJ	18 UJ	20 UJ	18 UJ
α-CHLORDANE	88 U	110 UJ	90 UJ	99 UJ	89 UJ
α-BHC (LINDANE)	8.8 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
ACHLOR	8.8 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
ACHLOR EPOXIDE	8.8 U	11 UJ	9.0 UJ	9.9 UJ	8.9 UJ
OXYCHLOR	88 U	110 UJ	90 UJ	99 UJ	89 UJ
PHENE	180 U	220 UJ	180 UJ	200 UJ	180 UJ

Concentration units - µg/kg - micrograms per kilogram.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
 Analyte present; reported as an estimated value.
 Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
 Unreliable result. Analyte may or may not be present in the sample.
 No data qualifier required.

Table D-16
(continued)

No. D No. th (ft)	138-MSC-032 B3890C022-1 10 - 12	138-MSC-038 B3890C022-2 12 - 12.8	138-MSC-039 B3890C022-2 13 - 13.9	138-MSC-043 B3890C004 6 - 8	138-MSC-046 B3890C004 12 - 14	138-MSC-058 B3890C004 15 - 16.5							
	17	UJ	19	UJ	17	UJ	19	UJ	19	UJ	19	UJ	U
	17	UJ	19	UJ	17	UJ	19	UJ	19	UJ	19	UJ	U
	17	UJ	19	UJ	17	UJ	19	UJ	19	UJ	19	UJ	U
	8.5	UJ	9.6	UJ	8.6	UJ	9.4	UJ	9.6	UJ	9.7	UJ	U
RDANE	85	UJ	96	UJ	86	UJ	94	UJ	96	UJ	97	UJ	U
	8.5	UJ	9.6	UJ	8.6	UJ	9.4	UJ	9.6	UJ	9.7	UJ	U
16	85	UJ	96	UJ	86	UJ	94	UJ	96	UJ	97	UJ	U
21	85	UJ	96	UJ	86	UJ	94	UJ	96	UJ	97	UJ	U
32	85	UJ	96	UJ	86	UJ	94	UJ	96	UJ	97	UJ	U
42	85	UJ	96	UJ	86	UJ	94	UJ	96	UJ	97	UJ	U
48	85	UJ	96	UJ	86	UJ	94	UJ	96	UJ	97	UJ	U
54	170	UJ	190	UJ	170	UJ	190	UJ	190	UJ	190	UJ	U
60	170	UJ	190	UJ	170	UJ	190	UJ	190	UJ	190	UJ	U
	8.5	UJ	9.6	UJ	8.6	UJ	9.4	UJ	9.6	UJ	9.7	UJ	U
	8.5	UJ	9.6	UJ	8.6	UJ	9.4	UJ	9.6	UJ	9.7	UJ	U
I	17	UJ	19	UJ	17	UJ	19	UJ	19	UJ	19	UJ	U
II	8.5	UJ	9.6	UJ	8.6	UJ	9.4	UJ	9.6	UJ	9.7	UJ	U
SULFATE	17	UJ	19	UJ	17	UJ	19	UJ	19	UJ	19	UJ	U
	17	UJ	19	UJ	17	UJ	19	UJ	19	UJ	19	UJ	U
EHYDE	17	UJ	19	UJ	17	UJ	19	UJ	19	UJ	19	UJ	U
ONE	17	UJ	19	UJ	17	UJ	19	UJ	19	UJ	19	UJ	U
RDANE	85	UJ	96	UJ	86	UJ	94	UJ	96	UJ	97	UJ	U
(LINDANE)	8.5	UJ	9.6	UJ	8.6	UJ	9.4	UJ	9.6	UJ	9.7	UJ	U
	8.5	UJ	9.6	UJ	8.6	UJ	9.4	UJ	9.6	UJ	9.7	UJ	U
EPOXIDE	8.5	UJ	9.6	UJ	8.6	UJ	9.4	UJ	9.6	UJ	9.7	UJ	U
OR	85	UJ	96	UJ	86	UJ	94	UJ	96	UJ	97	UJ	U
	170	UJ	190	UJ	170	UJ	190	UJ	190	UJ	190	UJ	U

Ion units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

analyte was not detected. The minimum quantitation limit for the sample is reported.
 analyte present; reported as an estimated value.
 analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
 analyte not detected. Analyte may or may not be present in the sample.
 a qualifier required.

Table D-16
(continued)

of 12

D No. ID No. Depth (ft)	138-MSC-059 B3890C004 16.5 - 17.5	138-MSC-060 B3890C004 17.5 - 19.5	138-MSC-061 B3890C004 14.5 - 21.5	138-MSC-062 B3890C023 0 - 2	138-MSC-067 B3890C023 12 - 14	138-MSC-077 B3890C024 6 - 8
E						
	18 UJ	17 U	18 U	21 UJ	18 U	25 U
	18 UJ	17 U	18 U	21 UJ	18 U	25 U
	18 UJ	17 U	18 U	21 UJ	18 U	25 U
	9.2 UJ	8.7 U	8.9 U	10 UJ	9.2 U	12 U
LORDANE	92 UJ	87 U	89 U	100 UJ	92 U	120 U
C	9.2 UJ	8.7 U	8.9 U	10 UJ	9.2 U	12 U
1016	92 UJ	87 U	89 U	100 UJ	92 U	120 U
1221	92 UJ	87 U	89 U	100 UJ	92 U	120 U
1232	92 UJ	87 U	89 U	100 UJ	92 U	120 U
1242	92 UJ	87 U	89 U	100 UJ	92 U	120 U
1248	92 UJ	87 U	89 U	100 UJ	92 U	120 U
1254	180 UJ	170 U	180 U	210 UJ	180 U	250 U
1260	180 UJ	170 U	180 U	210 UJ	180 U	250 U
	9.2 UJ	8.7 U	8.9 U	10 UJ	9.2 U	12 U
C	9.2 UJ	8.7 U	8.9 U	10 UJ	9.2 U	12 U
	18 UJ	17 U	18 U	21 UJ	18 U	25 U
AN I	9.2 UJ	8.7 U	8.9 U	10 UJ	9.2 U	12 U
AN II	18 UJ	17 U	18 U	21 UJ	18 U	25 U
AN SULFATE	18 UJ	17 U	18 U	21 UJ	18 U	25 U
	18 UJ	17 U	18 U	21 UJ	18 U	25 U
L DENYDE	18 UJ	17 U	18 U	21 UJ	18 U	25 U
ETONE	18 UJ	17 U	18 U	21 UJ	18 U	25 U
LORDANE	92 UJ	87 U	89 U	100 UJ	92 U	120 U
C (LINDANE)	9.2 UJ	8.7 U	8.9 U	10 UJ	9.2 U	12 U
OR	9.2 UJ	8.7 U	8.9 U	10 UJ	9.2 U	12 U
OR EPOXIDE	9.2 UJ	8.7 U	8.9 U	10 UJ	9.2 U	12 U
ILOR	92 UJ	87 U	89 U	100 UJ	92 U	120 U
	180 UJ	170 U	180 U	210 UJ	180 U	250 U

tion units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

analyte was not detected. The minimum quantitation limit for the sample is reported.

te present; reported as an estimated value.

te analyzed for but not detected, but must be estimated due to quality control considerations.

table result. Analyte may or may not be present in the sample.

ta qualifier required.

Table D-16
(continued)

12

No. D No. th (ft)	138-MSC-079 83890C005 0 - 2	138-MSC-082 83890C005 14 - 16	138-MSC-087 83890C025 10 - 12	138-MSC-093 83890C031 10 - 12	138-MSC-098 83890C030 4 - 6	138-MSC-105 83890C021 6 - 8
	18 U	19 U	21 U	23 U	18 U	310 U
	18 U	19 U	21 U	23 U	18 U	310 U
	18 U	19 U	21 U	23 U	18 U	310 U
	8.8 U	9.7 U	11 U	11 U	8.8 U	150 U
RDANE	88 U	97 U	110 U	110 U	88 U	1500 U
	8.8 U	9.7 U	11 U	11 U	8.8 U	150 U
16	88 U	97 U	110 U	110 U	88 U	1500 U
21	88 U	97 U	110 U	110 U	88 U	1500 U
32	88 U	97 U	110 U	110 U	88 U	1500 U
42	88 U	97 U	110 U	110 U	88 U	1500 U
48	88 U	97 U	110 U	110 U	88 U	1500 U
54	180 U	190 U	210 U	230 U	180 U	3100 U
50	180 U	190 U	210 U	230 U	180 U	3100 U
	8.8 U	9.7 U	11 U	11 U	8.8 U	150 U
	8.8 U	9.7 U	11 U	11 U	8.8 U	150 U
	18 U	19 U	21 U	23 U	18 U	310 U
I	8.8 U	9.7 U	11 U	11 U	8.8 U	150 U
II	18 U	19 U	21 U	23 U	18 U	310 U
SULFATE	18 U	19 U	21 U	23 U	18 U	310 U
	18 U	19 U	21 U	23 U	18 U	310 U
ENYDE	18 U	19 U	21 U	23 U	18 U	310 U
ONE	18 U	19 U	21 U	23 U	18 U	310 U
RDANE	88 U	97 U	110 U	110 U	88 U	1500 U
(LINDANE)	8.8 U	9.7 U	11 U	11 U	8.8 U	150 U
	8.8 U	9.7 U	11 U	11 U	8.8 U	150 U
EPOXIDE	8.8 U	9.7 U	11 U	11 U	8.8 U	150 U
OR	88 U	97 U	110 U	110 U	88 U	1500 U
	180 U	190 U	210 U	230 U	180 U	3100 U

on units - µg/kg - micrograms per kilogram.

lyte was not detected. The minimum quantitation limit for the sample is reported.

i present; reported as an estimated value.

e was analyzed for but not detected, but must be estimated due to quality control considerations.

ble result. Analyte may or may not be present in the sample.

i qualifier required.

Table D-16
(continued)

f 12

D No. ID No. Depth (ft)	138-MSC-106 B3890C021 10 - 12	138-MSC-113 B3890C012 10 - 12	138-MSC-122 B3890C033 5 - 7	138-MSC-125 B3890C027 4 - 6	138-MSC-127 B3890C027 8 - 10	138-MSC-142 B3890C032 4 - 6
	19 U	29 U	18 U	18 U	18 U	18 U
	19 U	29 U	18 U	18 U	18 U	18 U
	19 U	29 U	18 U	18 U	18 U	18 U
	9.3 U	14 U	8.9 U	9.2 U	9.1 U	8.9 U
ORDANE	93 U	140 U	89 U	92 U	91 U	89 U
	9.3 U	14 U	8.9 U	9.2 U	9.1 U	8.9 U
1016	93 U	140 U	89 U	92 U	91 U	89 U
1221	93 U	140 U	89 U	92 U	91 U	89 U
1232	93 U	140 U	89 U	92 U	91 U	89 U
1242	93 U	140 U	89 U	92 U	91 U	89 U
1248	93 U	140 U	89 U	92 U	91 U	89 U
1254	190 U	290 U	180 U	180 U	180 U	180 U
1260	190 U	290 U	180 U	180 U	180 U	180 U
	9.3 U	14 U	8.9 U	9.2 U	9.1 U	8.9 U
	9.3 U	14 U	8.9 U	9.2 U	9.1 U	8.9 U
	19 U	29 U	18 U	18 U	18 U	18 U
N I	9.3 U	14 U	8.9 U	9.2 U	9.1 U	8.9 U
N II	19 U	29 U	18 U	18 U	18 U	18 U
N SULFATE	19 U	29 U	18 U	18 U	18 U	18 U
	19 U	29 U	18 U	18 U	18 U	18 U
DEHYDE	19 U	29 U	18 U	18 U	18 U	18 U
ONE	19 U	29 U	18 U	18 U	18 U	18 U
ORDANE	93 U	140 U	89 U	92 U	91 U	89 U
(LINDANE)	9.3 U	14 U	8.9 U	9.2 U	9.1 U	8.9 U
R	9.3 U	14 U	8.9 U	9.2 U	9.1 U	8.9 U
R EPOXIDE	9.3 U	14 U	8.9 U	9.2 U	9.1 U	8.9 U
LOR	93 U	140 U	89 U	92 U	91 U	89 U
	190 U	290 U	180 U	180 U	180 U	180 U

tion units - µg/kg - micrograms per kilogram.

alyte was not detected. The minimum quantitation limit for the sample is reported.

te present; reported as an estimated value.

te was analyzed for but not detected, but must be estimated due to quality control considerations.

table result. Analyte may or may not be present in the sample.

ia qualifier required.

Table D-16
(continued)

D. No.	138-MSC-145 B3890C010	138-MSC-150 B3890C028	138-MSC-167 B3890C017	138-MSC-171 B3890C018	138-MSC-178 B3890C014	138-MSC-180 B3890C026
h (ft)	6 - 8	8 - 11	12 - 14	4 - 6	12 - 14	0 - 2
	18 U	18 U	18 U	18 U	17 U	35 UJ
	18 U	18 U	18 U	18 U	17 U	35 UJ
	18 U	18 U	18 U	18 U	17 U	35 UJ
	9.2 U	8.9 U	8.8 U	9.2 U	8.7 U	17 UJ
DANE	92 U	89 U	88 U	92 U	87 U	170 UJ
	9.2 U	8.9 U	8.8 U	9.2 U	8.7 U	17 UJ
6	92 U	89 U	88 U	92 U	87 U	170 UJ
1	92 U	89 U	88 U	92 U	87 U	170 UJ
2	92 U	89 U	88 U	92 U	87 U	170 UJ
2	92 U	89 U	88 U	92 U	87 U	170 UJ
8	92 U	89 U	88 U	92 U	87 U	170 UJ
4	180 U	180 U	180 U	180 U	170 U	350 UJ
0	180 U	180 U	180 U	180 U	170 U	350 UJ
	9.2 U	8.9 U	8.8 U	9.2 U	8.7 U	17 UJ
	9.2 U	8.9 U	8.8 U	9.2 U	8.7 U	17 UJ
	18 U	18 U	18 U	18 U	17 U	35 UJ
I	9.2 U	8.9 U	8.8 U	9.2 U	8.7 U	17 UJ
II	18 U	18 U	18 U	18 U	17 U	35 UJ
SULFATE	18 U	18 U	18 U	18 U	17 U	35 UJ
	18 U	18 U	18 U	18 U	17 U	35 UJ
HYDE	18 U	18 U	18 U	18 U	17 U	35 UJ
NE	18 U	18 U	18 U	18 U	17 U	35 UJ
DANE	92 U	18 J	88 U	92 U	87 U	20 J
LINDANE)	9.2 U	6.0 J	8.8 U	9.2 U	8.7 U	17 UJ
	9.2 U	8.9 U	8.8 U	9.2 U	8.7 U	17 UJ
EPOXIDE	9.2 U	8.9 U	8.8 U	9.2 U	8.7 U	17 UJ
R	92 U	89 U	88 U	92 U	87 U	170 UJ
	180 U	180 U	180 U	180 U	170 U	350 UJ

on units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

lyte was not detected. The minimum quantitation limit for the sample is reported.
 present; reported as an estimated value.
 e was analyzed for but not detected, but must be estimated due to quality control considerations.
 ble result. Analyte may or may not be present in the sample.
 qualifier required.

Table D-16
(continued)

Sample No.	138-MSC-183 B3890C026 12 - 14	138-MSC-184 B3890C012 14 - 16	138-MSC-196 B3890C016 14 - 16	138-MSC-202 B3890C009 8 - 10	138-MSC-208 B3890C011 12 - 14	138-MSC-215 B3890C029 12 - 14
	19 U	17 U	18 U	19 U	19 U	23 U
	19 U	17 U	18 U	19 U	19 U	23 U
	19 U	17 U	18 U	19 U	19 U	23 U
	9.5 U	8.6 U	8.8 U	9.5 U	9.3 U	11 U
DANE	95 U	86 U	88 U	95 U	93 U	110 U
	9.5 U	8.6 U	8.8 U	9.5 U	9.3 U	11 U
5	95 U	86 U	88 U	95 U	93 U	110 U
1	95 U	86 U	88 U	95 U	93 U	110 U
2	95 U	86 U	88 U	95 U	93 U	110 U
2	95 U	86 U	88 U	95 U	93 U	110 U
3	95 U	86 U	88 U	95 U	93 U	110 U
6	190 U	170 U	180 U	190 U	190 U	230 U
3)	190 U	170 U	180 U	190 U	190 U	230 U
	9.5 U	8.6 U	8.8 U	9.5 U	9.3 U	11 U
	9.5 U	8.6 U	8.8 U	9.5 U	9.3 U	11 U
	19 U	17 U	18 U	19 U	19 U	23 U
I	9.5 U	8.6 U	8.8 U	9.5 U	9.3 U	11 U
11	19 U	17 U	18 U	19 U	19 U	23 U
SULFATE	19 U	17 U	18 U	19 U	19 U	23 U
	19 U	17 U	18 U	19 U	19 U	23 U
HYDE	19 U	17 U	18 U	19 U	19 U	23 U
NE	19 U	17 U	18 U	19 U	19 U	23 U
DANE	95 U	86 U	88 U	95 U	93 U	110 U
LINDANE)	9.5 U	8.6 U	8.8 U	9.5 U	9.3 U	11 U
	9.5 U	8.6 U	8.8 U	9.5 U	9.3 U	11 U
EPOXIDE	9.5 U	8.6 U	8.8 U	9.5 U	9.3 U	11 U
R	95 U	86 U	88 U	95 U	93 U	110 U
	190 U	170 U	180 U	190 U	190 U	230 U

on units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

lyte was not detected. The minimum quantitation limit for the sample is reported.

present; reported as an estimated value.

was analyzed for but not detected, but must be estimated due to quality control considerations.

ble result. Analyte may or may not be present in the sample.

qualifier required.

Table D-16
(continued)

Depth (ft)	138-MSC-223 B3890C001-2 4 - 6	138-MSC-224 B3890C001-2 10 - 12	138-MSC-231 B3890C003-2 0 - 2	138-MSC-239 B3890C003-2 15 - 17.5	138-MSC-243 B3890C034 6 - 8	138-MSC-272 B3890C013 12 - 14		
	170	U	17	U	18	U	8.8	U
	170	U	17	U	18	U	8.8	U
	170	U	17	U	18	U	8.8	U
	85	U	8.5	U	9.2	U	4.4	U
NE	850	U	85	U	92	U	44	U
	85	U	8.5	U	9.2	U	4.4	U
	850	U	85	U	92	U	44	U
	850	U	85	U	92	U	44	U
	850	U	85	U	92	U	44	U
	850	U	85	U	92	U	44	U
	850	U	85	U	92	U	44	U
	1700	U	170	U	180	U	88	U
	1700	U	170	U	180	U	88	U
	85	U	8.5	U	9.2	U	4.4	U
	85	U	8.5	U	9.2	U	4.4	U
	170	U	17	U	18	U	8.8	U
	85	U	8.5	U	9.2	U	4.4	U
	170	U	17	U	18	U	8.8	U
JLFATE	170	U	17	U	18	U	8.8	U
	170	U	17	U	18	U	8.8	U
	170	U	17	U	18	U	8.8	U
DE	170	U	17	U	18	U	8.8	U
	170	U	17	U	18	U	8.8	U
NE	850	U	85	U	92	U	44	U
INDANE)	85	U	8.5	U	9.2	U	4.4	U
	85	U	8.5	U	9.2	U	4.4	U
OXIDE	85	U	8.5	U	9.2	U	4.4	U
	850	U	85	U	92	U	44	U
	1700	U	170	U	180	U	88	U

U units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U was not detected. The minimum quantitation limit for the sample is reported.
 U present; reported as an estimated value.
 U was analyzed for but not detected, but must be estimated due to quality control considerations.
 U is a false result. Analyte may or may not be present in the sample.
 U no qualifier required.

Table D-16
(continued)

Depth (ft)	138-MSC-274 B3890C008-1 0 - 2	138-MSC-280 B3890C020 0 - 2	138-MSC-284 B3890C020 8 - 10	138-MSC-289 B3890C019 6 - 8	138-MSC-291 B3890C008-1 14 - 16	138-MSC-308 B3890C006-2 6 - 8						
	10	U	7.6	J	9.3	U	12	U	8.7	U	34	UJ
	10	U	45	UJ	9.3	U	12	U	8.7	U	34	UJ
	10	U	45	UJ	9.3	U	12	U	8.7	U	34	UJ
	5.0	U	23	UJ	4.6	U	6.2	U	4.4	U	17	U
DANE	50	U	24	J	46	U	62	U	44	U	170	U
	5.0	U	23	UJ	4.6	U	6.2	U	4.4	U	17	U
5	50	U	230	UJ	46	U	62	U	44	U	170	U
1	50	U	230	UJ	46	U	62	U	44	U	170	U
2	50	U	230	UJ	46	U	62	U	44	U	170	U
2	50	U	230	UJ	46	U	62	U	44	U	170	U
8	50	U	230	UJ	46	U	62	U	44	U	170	U
6	100	U	450	UJ	93	U	120	U	87	U	340	U
0	100	U	450	UJ	93	U	120	U	87	U	340	U
	5.0	U	23	UJ	4.6	U	6.2	U	4.4	U	17	UJ
	5.0	U	23	UJ	4.6	U	6.2	U	4.4	U	17	UJ
	10	U	45	UJ	9.3	U	12	U	8.7	U	34	U
I	5.0	U	23	UJ	4.6	U	6.2	U	4.4	U	17	U
II	10	U	45	UJ	9.3	U	12	U	8.7	U	34	U
SULFATE	10	U	45	UJ	9.3	U	12	U	8.7	U	34	UJ
	10	U	45	UJ	9.3	U	12	U	8.7	U	34	U
HYDE	10	U	45	UJ	9.3	U	12	U	8.7	U	34	U
NE	10	U	45	UJ	9.3	U	12	U	8.7	U	34	U
DANE	50	U	20	J	46	U	62	U	44	U	170	U
LINDANE)	5.0	U	23	UJ	4.6	U	6.2	U	4.4	U	17	U
	5.0	U	23	UJ	4.6	U	6.2	U	4.4	U	17	U
EPOXIDE	5.0	U	23	UJ	4.6	U	6.2	U	4.4	U	17	U
R	50	U	230	UJ	46	U	62	U	44	U	170	U
	100	U	450	UJ	93	U	120	U	87	U	340	U

on units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

lyte was not detected. The minimum quantitation limit for the sample is reported.

present; reported as an estimated value.

e was analyzed for but not detected, but must be estimated due to quality control considerations.

ble result. Analyte may or may not be present in the sample.

qualifier required.

Table D-16
(continued)

lo.) No. th (ft)	138-MSC-314 B3890C022-3 14 - 16	138-MSC-320 B3890C015-1 12 - 14	138-MSC-324 B3890C028-1 6 - 8	138-MSC-329 B3890C024-2 6 - 8	138-MSC-330 B3890C024-2 10 - 14	138-MSC-334 B3890C030-1 4 - 6
	20	9.4	91	23	18	21
	U	U	U	U	U	U
	20	9.4	91	23	18	21
	U	U	U	U	U	U
	20	9.4	91	23	18	21
	U	U	U	U	U	U
	9.9	4.7	45	12	8.8	10
	U	U	U	U	U	U
DANE	99	47	450	120	88	100
	U	U	U	U	U	U
	9.9	4.7	45	12	8.8	10
	U	U	U	U	U	U
6	99	47	450	120	88	100
	U	U	U	U	U	U
11	99	47	450	120	88	100
	U	U	U	U	U	U
12	99	47	450	120	88	100
	U	U	U	U	U	U
2	99	47	450	120	88	100
	U	U	U	U	U	U
8	99	47	450	120	88	100
	U	U	U	U	U	U
4	200	94	910	230	180	210
	U	U	U	U	U	U
0	200	94	910	230	180	210
	U	U	U	U	U	U
	9.9	4.7	45	12	8.8	10
	U	U	U	U	U	U
	9.9	4.7	45	12	8.8	10
	U	U	U	U	U	U
	20	9.4	91	23	18	21
	U	U	U	U	U	U
1	9.9	4.7	45	12	8.8	10
	U	U	U	U	U	U
11	20	9.4	91	23	18	21
	U	U	U	U	U	U
SULFATE	20	9.4	91	23	18	21
	U	U	U	U	U	U
	20	9.4	91	23	18	21
	U	U	U	U	U	U
HYDE	20	9.4	91	23	18	21
	U	U	U	U	U	U
NE	20	9.4	91	23	18	21
	U	U	U	U	U	U
DANE	99	47	450	120	88	100
	U	U	U	U	U	U
LINDANE)	9.9	4.7	45	12	8.8	10
	U	U	U	U	U	U
	9.9	4.7	45	12	8.8	10
	U	U	U	U	U	U
EPOXIDE	9.9	4.7	45	12	8.8	10
	U	U	U	U	U	U
R	99	47	450	120	88	100
	U	U	U	U	U	U
	200	94	910	230	180	210
	U	U	U	U	U	U

on units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

lyte was not detected. The minimum quantitation limit for the sample is reported.

present; reported as an estimated value.

e was analyzed for but not detected, but must be estimated due to quality control considerations.

ble result. Analyte may or may not be present in the sample.

qualifier required.

Table D-16
(continued)

12

No. D No. th (ft)	138-MSC-336 B3890C030-2 10 - 14		138-MSC-338 B3890C010-1 0 - 2		138-MSC-339 B3890C010-1 4 - 8	
	19	U	41	U	17	U
	19	U	41	U	17	U
	19	U	41	U	17	U
	9.3	U	20	U	8.4	U
RDANE	93	U	200	U	84	U
	9.3	U	20	U	8.4	U
16	93	U	200	U	84	U
21	93	U	200	U	84	U
32	93	U	200	U	84	U
42	93	U	200	U	84	U
48	93	U	200	U	84	U
54	190	U	410	U	170	U
60	190	U	100	J	170	U
	9.3	U	20	U	8.4	U
	9.3	U	20	U	8.4	U
	19	U	41	U	17	U
I	9.3	U	20	U	8.4	U
II	19	U	41	U	17	U
SULFATE	19	U	41	U	17	U
	19	U	41	U	17	U
ETHYDE	19	U	41	U	17	U
ONE	19	U	41	U	17	U
RDANE	93	U	200	U	84	U
(LINDANE)	9.3	U	20	U	8.4	U
	9.3	U	20	U	8.4	U
EPOXIDE	9.3	U	20	U	8.4	U
OR	93	U	200	U	84	U
	190	U	410	U	170	U

on units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

lyte was not detected. The minimum quantitation limit for the sample is reported.

: present; reported as an estimated value.

re was analyzed for but not detected, but must be estimated due to quality control considerations.

ible result. Analyte may or may not be present in the sample.

) qualifier required.

Table D-17
Total Petroleum Hydrocarbons,
MISS Onsite Soil Samples

Sample ID No.	Borehole ID No.	Sample Depth (ft)	Concentration (mg/kg)	Flag
138-MSC-005	B3890C001	10-12	4.7	J
138-MSC-006	B3890C001	0-10	46	=
138-MSC-012	B3890C003-1	10-12	400	=
138-MSC-013	B3890C003-1	0-10	1100	=
138-MSC-020	B3890C002	2-4	220	=
138-MSC-021	B3890C002	4-6	3.8	J
138-MSC-022	B3890C002	6-8	69	=
138-MSC-025	B3890C002	0-8	150	=
138-MSC-028	B3890C022	4-6	85	=
138-MSC-047	B3890C004	0-10	160	=
138-MSC-066	B3890C023	0-8	10	=
138-MSC-074	B3890C007	14-16	9.9	=
138-MSC-076	B3890C024	0-8	4.4	J
138-MSC-078	B3890C024	10-12	5.3	=
138-MSC-081	B3890C005	4-6	32	=
138-MSC-086	B3890C025	0-8	14	=
138-MSC-094	B3890C031	12-14	3.9	J
138-MSC-095	B3890C031	0-10	6.3	=
138-MSC-100	B3890C030	10-12	3.7	J
138-MSC-101	B3890C030	0-10	15	=
138-MSC-107	B3890C021	0-8	260	=
138-MSC-116	B3890C012	0-13.5	5.3	=
138-MSC-126	B3890C027	0-7	400	=
138-MSC-133	B3890C015	10-12	24	=
138-MSC-134	B3890C033	0-3	220	=
138-MSC-143	B3890C032	0-3	810	=
138-MSC-151	B3890C028	0-8	24	=
138-MSC-168	B3890C017	0-9	12	=
138-MSC-172	B3890C018	0-2.5	28	=
138-MSC-179	B3890C014	0-10	24	=
138-MSC-182	B3890C026	0-8	5.4	J
138-MSC-197	B3890C016	0-12	420	=
138-MSC-203	B3890C009	0-8	14	=
138-MSC-207	B3890C011	0-6.5	450	=
138-MSC-225	B3890C001-2	0-8	13	=
138-MSC-238	B3890C003-2	0-12	670	=
138-MSC-244	B3890C034	0-4	210	=
138-MSC-285	B3890C020	0-4.5	16	=
138-MSC-290	B3890C019	0-4.5	120	=
138-MSC-292	B3890C008-1	0-12	20	=
138-MSC-306	B3890C006-2	2-4	290	=
138-MSC-325	B3890C028-1	0-8	90	=
138-MSC-331	B3890C024-1	0-8	4.8	J
138-MSC-337	B3890C030-2	0-8	55	=
138-MSC-340	B3890C010-1	0-2	62	=

Concentration units mg/kg - milligrams per kilogram.

J - estimated value.

= - No data qualifier required.

Table D-18
TCLP Metals, MISS Onsite Chemical
Soil Samples

of 13

ID No.	138-MSC-002	138-MSC-005	138-MSC-011	138-MSC-012	138-MSC-023	138-MSC-024
File ID No.	83890C001	83890C001	83890C003-1	83890C003	83890C002	83890C002
Depth (ft)	2 - 4	10 - 12	6 - 8	10 - 12	8 - 10	10 - 12
As, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Cd, TCLP Leachate	3880 =	956 =	381 =	365 =	213 =	256 =
Cr, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Pb, TCLP Leachate	14.2 =	98.5 =	10.0 U	10.7 =	10.0 U	63.6 =
Mn, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Hg, TCLP Leachate	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Cu, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Zn, TCLP Leachate	10.0 U	10.0 U	16.3 =	10.0 U	10.0 U	10.0 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

= analyte was not detected. The minimum detection limit for the sample is reported.
 = data qualifier required.

Table D-18
(continued)

3	138-MSC-029		138-MSC-031		138-MSC-032		138-MSC-038		138-MSC-039		138-MSC-044	
o. No. h (ft)	83890C022		83890C022-1		83890C022-1		83890C022-2		83890C022-2		83890C004	
	6 - 8		8 - 10		10 - 12		12 - 12.8		13 - 13.9		8 - 10	
e												
LP Leachate	500	U	500	U	500	U	500	U	500	U	500	U
P Leachate	200	U	200	U	290	=	200	U	200	U	365	=
LP Leachate	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U	5.0	U
CLP Leachate	10.0	U	10.0	U	172	=	15.1	=	35.8	=	10.0	U
Leachate	500	U	500	U	500	U	500	U	500	U	500	U
LP Leachate	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U	0.25	U
CLP Leachate	500	U	500	U	500	U	500	U	500	U	500	U
P Leachate	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U	10.0	U

ion Units - µg/L - micrograms per liter.

lyte was not detected. The minimum detection limit for the sample is reported.
qualifier required.

Table D-18
(continued)

3 of 13

ID No.	138-MSC-046	138-MSC-058	138-MSC-059	138-MSC-060	138-MSC-061	138-MSC-065
Site ID No.	83890C004	83890C004	83890C004	83890C004	83890C004	83890C023
Depth (ft)	12 - 14	15 - 16.5	16.5 - 17.5	17.5 - 19.5	19.5 - 21.5	6 - 8
Analyte						
Acid, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Aluminum, TCLP Leachate	579 =	209 =	260 =	398 =	505 =	200 U
Ammonia, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Barium, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Benzene, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Cadmium, TCLP Leachate	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Chromium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Copper, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

If an analyte was not detected. The minimum detection limit for the sample is reported.
U - data qualifier required.

Table D-18
(continued)

4 of 13

Well ID No. Sample ID No. Sample Depth (ft)	138-MSC-067 B3890C023 12 - 14	138-MSC-073 B3890C007 0 - 2	138-MSC-075 B3890C024 4 - 6	138-MSC-080 B3890C005 2 - 4	138-MSC-082 B3890C005 14 - 16	138-MSC-084 B3890C025 2 - 4
Analyte						
Chloride, TCLP Leachate	500 U	500 U	1450 =	500 U	500 U	500 U
Lead, TCLP Leachate	343 =	316 =	200 U	487 =	554 =	200 U
Mercury, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Nitrate, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Phosphate, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Sulfate, TCLP Leachate	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
Zinc, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Iron, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

= No analyte was not detected. The minimum detection limit for the sample is reported.
= data qualifier required.

Table D-18

(continued)

Page 5 of 13

Sample ID No.	138-MSC-087	138-MSC-092	138-MSC-099	138-MSC-104	138-MSC-106	138-MSC-114		
Borehole ID No.	B3890C025	B3890C031	B3890C030	B3890C021	B3890C021	B3890C012		
Sample Depth (ft)	10 - 12	8 - 10	6 - 8	4 - 6	10 - 12	12 - 14		
Analyte								
Arsenic, TCLP Leachate	500	U	763	=	500	U	500	U
Barium, TCLP Leachate	200	U	420	=	200	U	200	U
Cadmium, TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U
Chromium, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U
Lead, TCLP Leachate	500	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.25	U	0.25	U	0.25	U	0.25	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table D-18

(continued)

Page 6 of 13

Sample ID No.	138-MSC-117	138-MSC-121	138-MSC-122	138-MSC-124	138-MSC-127	138-MSC-131		
Borehole ID No.	B3890C015	B3890C033	B3890C033	B3890C027	B3890C027	B3890C015		
Sample Depth (ft)	12 - 14	3 - 5	5 - 7	2 - 4	8 - 10	6 - 8		
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	1610	=	200	U	615	=	955	=
Cadmium, TCLP Leachate	5.0	=	5.0	U	5.0	U	5.0	U
Chromium, TCLP Leachate	10.0	U	42.5	=	16.5	=	33.5	=
Lead, TCLP Leachate	500	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.25	U	2.0	=	0.25	U	0.25	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table D-18

(continued)

Page 7 of 13

Sample ID No.	138-MSC-140	138-MSC-142	138-MSC-144	138-MSC-145	138-MSC-149	138-MSC-150		
Borehole ID No.	B3890C032	B3890C032	B3890C010	B3890C010	B3890C028	B3890C028		
Sample Depth (ft)	0 - 2	4 - 6	0 - 2	6 - 8	6 - 8	8 - 11		
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	346	=	978	=	378	=	517	=
Cadmium, TCLP Leachate	5.0	U	5.0	U	9.7	=	5.0	U
Chromium, TCLP Leachate	13.2	=	10.0	U	103	=	10.0	U
Lead, TCLP Leachate	500	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.25	U	0.25	U	0.25	U	0.25	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table D-18
(continued)

Page 8 of 13

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-162 B3890C017 0 - 2	138-MSC-167 B3890C017 12 - 14	138-MSC-169 B3890C018 0 - 2	138-MSC-171 B3890C018 4 - 6	138-MSC-174 B3890C014 2 - 4	138-MSC-178 B3890C014 12 - 14
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	610 =	500 U
Barium, TCLP Leachate	559 =	1480 =	397 =	410 =	200 U	801 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	20.0 =	10.0 U	25.1 =	13.5 =	10.0 U	10.0 U
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.

Table D-18

(continued)

Page 9 of 13

Sample ID No.	138-MSC-183	138-MSC-184	138-MSC-195	138-MSC-196	138-MSC-199	138-MSC-202		
Borehole ID No.	B3890C026	B3890C012	B3890C016	B3890C016	B3890C009	B3890C009		
Sample Depth (ft)	12 - 14	14 - 16	10 - 12	14 - 16	2 - 4	8 - 10		
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	200	U	970	=	200	U	228	=
Cadmium, TCLP Leachate	5.0	U	9.5	=	5.0	U	5.0	U
Chromium, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U
Lead, TCLP Leachate	500	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.20	U	0.20	U	0.20	U	0.20	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table D-18
(continued)

Page 10 of 13

Sample ID No.	138-MSC-206	138-MSC-208	138-MSC-212	138-MSC-215	138-MSC-222	138-MSC-224
Corehole ID No.	83890C011	83890C011	83890C029	83890C029	83890C001-2	83890C001-2
Sample Depth (ft)	4 - 6	12 - 14	6 - 8	12 - 14	2 - 4	10 - 12
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	343 =	438 =	200 U	200 U	260 =	550 =
Cadmium, TCLP Leachate	9.8 =	6.1 =	5.0 U	5.0 U	5.0 U	5.3 =
Chromium, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	11.6 =	45.6 =
Copper, TCLP Leachate	1380 =	500 U	500 U	500 U	90.0 U	90.0 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.

Table D-18
(continued)

Page 11 of 13

Sample ID No.	138-MSC-234	138-MSC-239	138-MSC-241	138-MSC-243	138-MSC-305	138-MSC-308		
Borehole ID No.	B3890C003-2	B3890C003-2	B3890C034	B3890C034	B3890C006-2	B3890C006-2		
Sample Depth (ft)	6 - 8	15 - 17.5	2 - 4	6 - 8	2 - 4	6 - 8		
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	200	U	376	=	401	=	200	U
Cadmium, TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U
Chromium, TCLP Leachate	23.1	=	46.0	=	10.0	U	10.0	U
Lead, TCLP Leachate	90.0	U	90.0	U	90.0	U	179	=
Mercury, TCLP Leachate	0.20	U	0.20	U	0.20	U	0.25	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	10.0	U	10.0	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table D-18
(continued)

Page 12 of 13

Sample ID No.	138-MSC-314	138-MSC-328	138-MSC-074	138-MSC-330	138-MSC-335	138-MSC-336
Borehole ID No.	B3890C022-3	B3890C024-1	B3890C007	B3890C024-2	B3890C030-2	B3890C030-2
Sample Depth (ft)	14 - 16	4 - 6	14 - 16	10 - 14	6 - 8	10 - 14
Analyte						
Arsenic, TCLP Leachate	500 U	1350 =	500 U	500 U	880 =	500 U
Barium, TCLP Leachate	229 =	200 U	386 =	513 =	376 =	200 U
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	44.1 =	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Lead, TCLP Leachate	90.0 U	90.0 U	500 U	90.0 U	90.0 U	90.0 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.25 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	100 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.1 U	10.0 U	10.0 U	10.0 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table D-18

(continued)

Page 13 of 13

Sample ID No.	138-MSC-339		138-MSC-078		138-MSC-094		138-MSC-100	
Borehole ID No.	B3890C010-1		B3890C024		B3890C031		B3890C030	
Sample Depth (ft)	4 - 8		10 - 12		12 - 14		10 - 12	
Analyte								
Arsenic, TCLP Leachate	500	U	500	U	500	U	500	U
Barium, TCLP Leachate	524	=	778	U	730	=	526	=
Cadmium, TCLP Leachate	5.0	U	5.0	U	5.0	U	5.0	U
Chromium, TCLP Leachate	12.2	=	10.0	U	51.1	=	10.0	U
Lead, TCLP Leachate	90.0	U	500	U	500	U	500	U
Mercury, TCLP Leachate	0.20	U	0.25	U	0.25	U	0.25	U
Selenium, TCLP Leachate	500	U	500	U	500	U	500	U
Silver, TCLP Leachate	10.0	U	10.0	U	15.2	=	10.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

**Table D-19
TCLP - Volatile Organic Compounds,
MISS Onsite Soil Samples**

Page 1 of 12

Sample ID No.	138-MSC-002	138-MSC-005	138-MSC-011	138-MSC-012	138-MSC-023	138-MSC-024
Wellbore ID No.	B3890C001	B3890C001	B3890C003-1	B3890C003	B3890C002	B3890C002
Sample Depth (ft)	2 - 4	10 - 12	6 - 8	10 - 12	8 - 10	10 - 12
Analyte						
1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
PERC TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
ETHYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-19

(continued)

Page 2 of 12

Sample ID No.	138-MSC-029	138-MSC-031	138-MSC-032	138-MSC-038	138-MSC-039	138-MSC-044
Borehole ID No.	B3890C022	B3890C022-1	B3890C022-1	B3890C022-2	B3890C022-2	B3890C004
Sample Depth (ft)	6 - 8	8 - 10	10 - 12	12 - 12.8	13 - 13.9	8 - 10
Analyte						
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
TETRACHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
VINYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

Table D-19

(continued)

Page 3 of 12

Sample ID No.	138-MSC-046	138-MSC-058	138-MSC-059	138-MSC-060	138-MSC-061	138-MSC-065		
Well ID No.	B3890C004	B3890C004	B3890C004	B3890C004	B3890C004	B3890C023		
Sample Depth (ft)	12 - 14	15 - 16.5	16.5 - 17.5	17.5 - 19.5	19.5 - 21.5	6 - 8		
Analyte								
1-DICHLOROETHYLENE	50	U	50	U	50	U	50	U
2-DICHLOROETHANE	50	U	50	U	50	U	50	U
BUTANONE	100	U	100	U	100	U	100	U
BENZENE	50	U	50	U	50	U	50	U
PERCHLOROETHYLENE	50	U	50	U	50	U	50	U
PERBROMOETHYLENE	50	U	50	U	50	U	50	U
PERBROMOTETRACHLORIDE	50	U	50	U	50	U	50	U
PERBROMOBENZENE	50	U	50	U	50	U	50	U
PERBROMOFORM	50	U	50	U	50	U	50	U
PERCHLOROETHYLENE	50	U	50	U	50	U	50	U
PERCHLOROETHYLENE	50	U	50	U	50	U	50	U
PERCHLOROPOLYETHYLENE	100	U	100	U	100	U	100	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-19

(continued)

Page 4 of 12

Sample ID No.	138-MSC-067	138-MSC-073	138-MSC-075	138-MSC-080	138-MSC-082	138-MSC-084		
Borehole ID No.	B3890C023	B3890C007	B3890C024	B3890C005	B3890C005	B3890C025		
Sample Depth (ft)	12 - 14	0 - 2	4 - 6	2 - 4	14 - 16	2 - 4		
Analyte								
1,1-DICHLOROETHYLENE	50	U	50	U	50	U	50	U
1,2-DICHLOROETHANE	50	U	50	U	50	U	50	U
2-BUTANONE	100	U	100	U	100	U	100	U
BENZENE	50	U	50	U	50	U	50	U
CARBON TETRACHLORIDE	50	U	50	U	50	U	50	U
CHLOROBENZENE	50	U	50	U	50	U	50	U
CHLOROFORM	50	U	50	U	50	U	50	U
TETRACHLOROETHYLENE	50	U	50	U	50	U	50	U
TRICHLOROETHYLENE	50	U	50	U	50	U	50	U
VINYL CHLORIDE	100	U	100	U	100	U	100	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 J - Analyte present; reported as an estimated value.

Table D-19
(continued)

Page 5 of 12

Sample ID No.	138-MSC-087	138-MSC-092	138-MSC-099	138-MSC-104	138-MSC-106	138-MSC-114		
Well ID No.	B3890C025	B3890C031	B3890C030	B3890C021	B3890C021	B3890C012		
Sample Depth (ft)	10 - 12	8 - 10	6 - 8	4 - 6	10 - 12	12 - 14		
Analyte								
1-DICHLOROETHYLENE	50	U	50	U	50	U	50	U
2-DICHLOROETHANE	50	U	50	U	50	U	50	U
BUTANONE	100	U	100	U	100	U	100	U
BENZENE	50	U	50	U	50	U	50	U
PERFLUOROTETRACHLORIDE	50	U	50	U	50	U	50	U
PERFLUOROBENZENE	50	U	50	U	50	U	50	U
PERFLUOROFORM	50	U	50	U	50	U	50	U
PERTRICHLOROETHYLENE	50	U	50	U	50	U	50	U
PERDICHLOROETHYLENE	50	U	50	U	50	U	50	U
PERCHLORIDE	100	U	100	U	100	U	100	U

Concentration Units - µg/L - micrograms per liter.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- - Analyte present; reported as an estimated value.

Table D-19
(continued)

Page 6 of 12

Sample ID No.	138-MSC-121	138-MSC-122	138-MSC-124	138-MSC-127	138-MSC-131	138-MSC-140		
Borehole ID No.	B3890C033	B3890C033	B3890C027	B3890C027	B3890C015	B3890C032		
Sample Depth (ft)	3 - 5	5 - 7	2 - 4	8 - 10	6 - 8	0 - 2		
Analyte								
1,1-DICHLOROETHYLENE	50	U	50	U	50	U	50	U
1,2-DICHLOROETHANE	50	U	50	U	50	U	50	U
2-BUTANONE	100	U	100	U	100	U	100	U
BENZENE	50	U	50	U	50	U	50	U
CARBON TETRACHLORIDE	50	U	50	U	50	U	50	U
CHLOROBENZENE	50	U	50	U	50	U	50	U
CHLOROFORM	50	U	50	U	50	U	50	U
TETRACHLOROETHYLENE	50	U	50	U	50	U	50	U
TRICHLOROETHYLENE	50	U	50	U	50	U	50	U
VINYL CHLORIDE	100	U	100	U	100	U	100	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
J - Analyte present; reported as an estimated value.

Table D-19
(continued)

Well ID No.	138-MSC-142	138-MSC-144	138-MSC-145	138-MSC-149	138-MSC-150	138-MSC-162
Well ID No.	B3890C032	B3890C010	B3890C010	B3890C028	B3890C028	B3890C017
Well Depth (ft)	4 - 6	0 - 2	6 - 8	6 - 8	8 - 11	0 - 2
Analyte						
DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLORONITROBENZENE	100 U	100 U	100 U	100 U	100 U	100 U
PERCHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLOROTETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
Analyte present; reported as an estimated value.

Table D-19
(continued)

Page 8 of 12

Sample ID No. Well ID No. Sample Depth (ft)	138-MSC-167 B3890C017 12 - 14	138-MSC-169 B3890C018 0 - 2	138-MSC-171 B3890C018 4 - 6	138-MSC-174 B3890C014 2 - 4	138-MSC-178 B3890C014 12 - 14	138-MSC-183 B3890C026 12 - 14
Analyte						
1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
PERFLUOROTETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
PERFLUOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
PERFLUOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
PERCHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-19
(continued)

Page 9 of 12

Sample ID No.	138-MSC-184	138-MSC-195	138-MSC-196	138-MSC-199	138-MSC-202	138-MSC-206
Well ID No.	B3890C012	B3890C016	B3890C016	B3890C009	B3890C009	B3890C011
Sample Depth (ft)	14 - 16	10 - 12	14 - 16	2 - 4	8 - 10	4 - 6
Analyte						
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
PERFLUOROTETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
PERFLUOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
PERFLUOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
PERTRICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
PERDICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
PERMETHYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-19

(continued)

e 10 of 12

Sample ID No. Well ID No. Sample Depth (ft)	138-MSC-208 B3890C011 12 - 14	138-MSC-212 B3890C029 6 - 8	138-MSC-215 B3890C029 12 - 14	138-MSC-222 B3890C001-2 2 - 4	138-MSC-224 B3890C001-2 10 - 12	138-MSC-234 B3890C003-2 6 - 8
Analyte						
-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
BROMINE TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
BROMOBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
BROMOFORM	50 U	50 U	50 U	50 U	50 U	50 U
BISCHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
Analyte present; reported as an estimated value.

Table D-19
(continued)

Page 11 of 12

Sample ID No.	138-MSC-239	138-MSC-241	138-MSC-243	138-MSC-283	138-MSC-305	138-MSC-308		
Well ID No.	B3890C003-2	B3890C034	B3890C034	B3890C020	B3890C006-2	B3890C006-2		
Sample Depth (ft)	15 - 17.5	2 - 4	6 - 8	4 - 6	2 - 4	6 - 8		
Analyte								
-DICHLOROETHYLENE	50	U	50	U	50	U	50	U
-DICHLOROETHANE	50	U	50	U	50	U	50	U
ACETANONE	100	U	100	U	100	U	100	U
ACETONE	50	U	50	U	50	U	50	U
BROMINE TETRACHLORIDE	50	U	50	U	50	U	50	U
BROMOBENZENE	50	U	50	U	50	U	50	U
BROMOFORM	50	U	50	U	50	U	50	U
DICHLOROETHYLENE	50	U	50	U	50	U	50	U
DICHLOROETHYLENE	50	U	50	U	50	U	50	U
DICHLORIDE	100	U	100	U	100	U	100	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-19
(continued)

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-314 B3890C022-3 14 - 16	138-MSC-328 B3890C024-1 4 - 6	138-MSC-330 B3890C024-2 10 - 14	138-MSC-335 B3890C030-2 6 - 8	138-MSC-336 B3890C030-2 10 - 14	138-MSC-339 B3890C010-1 4 - 8
Analyte						
1,1-DICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
1,2-DICHLOROETHANE	50 U	50 U	50 U	50 U	50 U	50 U
2-BUTANONE	100 U	100 U	100 U	100 U	100 U	100 U
BENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CARBON TETRACHLORIDE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROBENZENE	50 U	50 U	50 U	50 U	50 U	50 U
CHLOROFORM	50 U	50 U	50 U	50 U	50 U	50 U
TETRACHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
TRICHLOROETHYLENE	50 U	50 U	50 U	50 U	50 U	50 U
VINYL CHLORIDE	100 U	100 U	100 U	100 U	100 U	100 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.

Table D-20
 TCLP - Semivolatile Organic Compounds,
 MISS Onsite Soil Samples

Page 1 of 13

Sample ID No. Well ID No. Sample Depth (ft)	138-MSC-002 B3890C001 2 - 4	138-MSC-005 B3890C001 10 - 12	138-MSC-011 B3890C003-1 6 - 8	138-MSC-012 B3890C003 10 - 12	138-MSC-023 B3890C002 8 - 10	138-MSC-024 B3890C002 10 - 12
Analyte						
-DICHLOROBENZENE	60 U	110 U	130 U	120 U	120 U	120 U
1,5-TRICHLOROPHENOL	300 U	550 U	650 U	600 U	600 U	600 U
1,6-TRICHLOROPHENOL	60 U	110 U	130 U	120 U	120 U	120 U
-DINITROTOLUENE	60 U	110 U	130 U	120 U	120 U	120 U
ETHYLPHENOL	60 U	110 U	130 U	120 U	120 U	120 U
ETHYLPHENOL	60 U	110 U	130 U	120 U	120 U	120 U
ACHLOROBENZENE	60 U	110 U	130 U	120 U	120 U	120 U
ACHLOROBUTADIENE	60 U	110 U	130 U	120 U	120 U	120 U
ACHLOROETHANE	60 U	110 U	130 U	120 U	120 U	120 U
ROBENZENE	60 U	110 U	130 U	120 U	120 U	120 U
TACHLOROPHENOL	300 U	550 U	650 U	600 U	600 U	600 U
IDINE	60 U	110 U	130 U	120 U	120 U	120 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
 Analyte present; reported as an estimated value.
 No data qualifier required.

Table D-20
(continued)

Page 2 of 13

Sample ID No.	138-MSC-029	138-MSC-031	138-MSC-032	138-MSC-038	138-MSC-039	138-MSC-044		
Borehole ID No.	B3890C022	B3890C022-1	B3890C022-1	B3890C022-2	B3890C022-2	B3890C004		
Sample Depth (ft)	6 - 8	8 - 10	10 - 12	12 - 12.8	13 - 13.9	8 - 10		
Analyte								
1,4-DICHLOROBENZENE	110	U	120	U	110	U	120	U
2,4,5-TRICHLOROPHENOL	550	U	600	U	550	U	600	U
2,4,6-TRICHLOROPHENOL	110	U	120	U	110	U	120	U
2,4-DINITROTOLUENE	110	U	120	U	110	U	120	U
2-METHYLPHENOL	110	U	120	U	110	U	120	U
4-METHYLPHENOL	110	U	120	U	110	U	120	U
HEXACHLOROBENZENE	110	U	120	U	110	U	120	U
HEXACHLOROBUTADIENE	110	U	120	U	110	U	120	U
HEXACHLOROETHANE	110	U	120	U	110	U	120	U
NITROBENZENE	110	U	120	U	110	U	120	U
PENTACHLOROPHENOL	550	U	600	U	550	U	600	U
PYRIDINE	110	U	120	U	110	U	120	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

= = No data qualifier required.

Table D-20
(continued)

Page 3 of 13

Sample ID No.	138-MSC-046	138-MSC-058	138-MSC-059	138-MSC-060	138-MSC-061	138-MSC-065						
Borehole ID No.	B3890C004	B3890C004	B3890C004	B3890C004	B3890C004	B3890C023						
Sample Depth (ft)	12 - 14	15 - 16.5	16.5 - 17.5	17.5 - 19.5	19.5 - 21.5	6 - 8						
Analyte												
1,4-DICHLOROBENZENE	110	U	60	U	60	U	50	U	55	U	60	U
2,4,5-TRICHLOROPHENOL	550	U	300	U	300	U	250	U	280	U	300	U
2,4,6-TRICHLOROPHENOL	110	U	60	U	60	U	50	U	55	U	60	U
2,4-DINITROTOLUENE	110	U	60	U	60	U	50	U	55	U	60	U
2-METHYLPHENOL	110	U	60	U	60	U	50	U	55	U	60	U
4-METHYLPHENOL	110	U	60	U	60	U	50	U	55	U	60	U
HEXACHLOROBENZENE	110	U	60	U	60	U	50	U	55	U	60	U
HEXACHLOROBUTADIENE	110	U	60	U	60	U	50	U	55	U	60	U
HEXACHLOROETHANE	110	U	60	U	60	U	50	U	55	U	60	U
NITROBENZENE	110	U	60	U	60	U	50	U	55	U	60	U
PENTACHLOROPHENOL	550	U	300	U	300	U	250	U	280	U	300	U
PYRIDINE	110	U	60	U	60	U	50	U	55	U	60	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

= = No data qualifier required.

Table D-20
(continued)

Page 4 of 13

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-067 B3890C023 12 - 14	138-MSC-073 B3890C007 0 - 2	138-MSC-075 B3890C024 4 - 6	138-MSC-080 B3890C005 2 - 4	138-MSC-082 B3890C005 14 - 16	138-MSC-084 B3890C025 2 - 4
Analyte						
1,4-DICHLOROBENZENE	55 U	12 U	50 U	60 U	60 U	70 U
2,4,5-TRICHLOROPHENOL	280 U	60 U	250 U	300 U	300 U	350 U
2,4,6-TRICHLOROPHENOL	55 U	12 U	50 U	60 U	60 U	70 U
2,4-DINITROTOLUENE	55 U	12 U	50 U	60 U	60 U	70 U
2-METHYLPHENOL	55 U	12 U	50 U	60 U	60 U	70 U
4-METHYLPHENOL	55 U	12 U	50 U	60 U	60 U	70 U
HEXACHLOROBENZENE	55 U	12 U	50 U	60 U	60 U	70 U
HEXACHLOROBUTADIENE	55 U	12 U	50 U	60 U	60 U	70 U
HEXACHLOROETHANE	55 U	12 U	50 U	60 U	60 U	70 U
NITROBENZENE	55 U	12 U	50 U	60 U	60 U	70 U
PENTACHLOROPHENOL	280 U	60 U	250 U	300 U	300 U	350 U
PYRIDINE	55 U	12 U	50 U	60 U	60 U	70 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 J - Analyte present; reported as an estimated value.
 = = No data qualifier required.

Table D-20
(continued)

Page 5 of 13

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-087 B3890C025 10 - 12	138-MSC-092 B3890C031 8 - 10	138-MSC-099 B3890C030 6 - 8	138-MSC-104 B3890C021 4 - 6	138-MSC-106 B3890C021 10 - 12	138-MSC-114 B3890C012 12 - 14
Analyte						
1,4-DICHLOROBENZENE	60 U	12 U	60 U	55 U	60 U	55 U
2,4,5-TRICHLOROPHENOL	300 U	60 U	300 U	280 U	300 U	280 U
2,4,6-TRICHLOROPHENOL	60 U	12 U	60 U	55 U	60 U	55 U
2,4-DINITROTOLUENE	60 U	12 U	60 U	55 U	60 U	55 U
2-METHYLPHENOL	60 U	12 U	60 U	55 U	60 U	55 U
4-METHYLPHENOL	60 U	12 U	60 U	55 U	60 U	55 U
HEXACHLOROBENZENE	60 U	12 U	60 U	55 U	60 U	55 U
HEXACHLOROBUTADIENE	60 U	12 U	60 U	55 U	60 U	55 U
HEXACHLOROETHANE	60 U	12 U	60 U	55 U	60 U	55 U
NITROBENZENE	60 U	12 U	60 U	55 U	60 U	55 U
PENTACHLOROPHENOL	300 U	60 U	300 U	280 U	300 U	280 U
PYRIDINE	60 U	12 U	60 U	55 U	60 U	55 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

= = No data qualifier required.

Table D-20
(continued)

Page 6 of 13

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-117 B3890C015 12 - 14	138-MSC-121 B3890C033 3 - 5	138-MSC-122 B3890C033 5 - 7	138-MSC-124 B3890C027 2 - 4	138-MSC-127 B3890C027 8 - 10	138-MSC-131 B3890C015 6 - 8
Analyte						
1,4-DICHLOROBENZENE	60 U	60 U	65 U	60 U	60 U	55 U
2,4,5-TRICHLOROPHENOL	300 U	300 U	320 U	300 U	300 U	280 U
2,4,6-TRICHLOROPHENOL	60 U	60 U	65 U	60 U	60 U	55 U
2,4-DINITROTOLUENE	60 U	60 U	65 U	60 U	60 U	55 U
2-METHYLPHENOL	60 U	60 U	65 U	60 U	60 U	55 U
4-METHYLPHENOL	60 U	12 J	65 U	60 U	60 U	55 U
HEXACHLOROBENZENE	60 U	60 U	65 U	60 U	60 U	55 U
HEXACHLOROBUTADIENE	60 U	60 U	65 U	60 U	60 U	55 U
HEXACHLOROETHANE	60 U	60 U	65 U	60 U	60 U	55 U
NITROBENZENE	60 U	60 U	65 U	60 U	60 U	55 U
PENTACHLOROPHENOL	300 U	300 U	320 U	300 U	300 U	280 U
PYRIDINE	60 U	60 U	65 U	60 U	60 U	55 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

= = No data qualifier required.

Table D-20
(continued)

Page 7 of 13

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-140 B3890C032 0 - 2	138-MSC-142 B3890C032 4 - 6	138-MSC-144 B3890C010 0 - 2	138-MSC-145 B3890C010 6 - 8	138-MSC-149 B3890C028 6 - 8	138-MSC-150 B3890C028 8 - 11
Analyte						
1,4-DICHLOROBENZENE	55 U	60 U	60 U	60 U	55 U	60 U
2,4,5-TRICHLOROPHENOL	280 U	300 U	300 U	300 U	280 U	300 U
2,4,6-TRICHLOROPHENOL	55 U	60 U	60 U	60 U	55 U	60 U
2,4-DINITROTOLUENE	55 U	60 U	60 U	60 U	55 U	60 U
2-METHYLPHENOL	55 U	60 U	60 U	60 U	55 U	60 U
4-METHYLPHENOL	55 U	60 U	60 U	60 U	55 U	60 U
HEXACHLOROBENZENE	55 U	60 U	60 U	60 U	55 U	60 U
HEXACHLOROBUTADIENE	55 U	60 U	60 U	60 U	55 U	60 U
HEXACHLOROETHANE	55 U	60 U	60 U	60 U	55 U	60 U
NITROBENZENE	55 U	60 U	60 U	60 U	55 U	60 U
PENTACHLOROPHENOL	280 U	300 U	300 U	300 U	280 U	300 U
PYRIDINE	55 U	60 U	60 U	60 U	55 U	60 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 J - Analyte present; reported as an estimated value.
 = = No data qualifier required.

Table D-20
(continued)

Page 8 of 13

Sample ID No.	138-MSC-162	138-MSC-167	138-MSC-169	138-MSC-171	138-MSC-174	138-MSC-178		
Borehole ID No.	B3890C017	B3890C017	B3890C018	B3890C018	B3890C014	B3890C014		
Sample Depth (ft)	0 - 2	12 - 14	0 - 2	4 - 6	2 - 4	12 - 14		
Analyte								
1,4-DICHLOROBENZENE	55	U	60	U	60	U	60	U
2,4,5-TRICHLOROPHENOL	280	U	300	U	300	U	300	U
2,4,6-TRICHLOROPHENOL	55	U	60	U	60	U	60	U
2,4-DINITROTOLUENE	55	U	60	U	60	U	60	U
2-METHYLPHENOL	55	U	60	U	60	U	60	U
4-METHYLPHENOL	55	U	60	U	60	U	60	U
HEXACHLOROBENZENE	55	U	60	U	60	U	60	U
HEXACHLOROBUTADIENE	55	U	60	U	60	U	60	U
HEXACHLOROETHANE	55	U	60	U	60	U	60	U
NITROBENZENE	55	U	60	U	60	U	60	U
PENTACHLOROPHENOL	280	U	300	U	300	U	300	U
PYRIDINE	55	U	60	U	60	U	60	U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

= = No data qualifier required.

Table D-20
(continued)

Page 9 of 13

Sample ID No.	138-MSC-183	138-MSC-184	138-MSC-195	138-MSC-196	138-MSC-199	138-MSC-202						
Drillhole ID No.	B3890C026	B3890C012	B3890C016	B3890C016	B3890C009	B3890C009						
Sample Depth (ft)	12 - 14	14 - 16	10 - 12	14 - 16	2 - 4	8 - 10						
Analyte												
1,4-DICHLOROBENZENE	50	U	60	U	60	U	70	U	60	U	60	U
1,4,5-TRICHLOROPHENOL	250	U	300	U	300	U	350	U	300	U	300	U
1,4,6-TRICHLOROPHENOL	50	U	60	U	60	U	70	U	60	U	60	U
1,4-DINITROTOLUENE	50	U	60	U	60	U	70	U	60	U	60	U
2-METHYLPHENOL	50	U	60	U	60	U	70	U	60	U	60	U
3-METHYLPHENOL	50	U	60	U	60	U	70	U	60	U	60	U
1,2-DICHLOROBENZENE	50	U	60	U	60	U	70	U	60	U	60	U
1,2-DICHLOROBUTADIENE	50	U	60	U	60	U	70	U	60	U	60	U
1,2-DICHLOROETHANE	50	U	60	U	60	U	70	U	60	U	60	U
1,2-DIBROMOBENZENE	50	U	60	U	60	U	70	U	60	U	60	U
1,2-DIBROMOETHANE	250	U	300	U	300	U	350	U	300	U	300	U
1,2-DIBROMOETHANE	50	U	60	U	60	U	70	U	60	U	60	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.
- = No data qualifier required.

Table D-20
(continued)

Page 10 of 13

Sample ID No.	138-MSC-206	138-MSC-208	138-MSC-212	138-MSC-215	138-MSC-222	138-MSC-224				
Well ID No.	B3890C011	B3890C011	B3890C029	B3890C029	B3890C001-2	B3890C001-2				
Sample Depth (ft)	4 - 6	12 - 14	6 - 8	12 - 14	2 - 4	10 - 12				
Analyte										
1,4-DICHLOROBENZENE	70	U	60	U	55	U	13	U	55	U
1,5-TRICHLOROPHENOL	350	U	300	U	280	U	65	U	280	U
1,6-TRICHLOROPHENOL	70	U	60	U	60	U	55	U	13	U
1,4-DINITROTOLUENE	70	U	60	U	60	U	55	U	13	U
METHYLPHENOL	70	U	60	U	60	U	55	U	13	U
METHYLPHENOL	70	U	60	U	60	U	55	U	13	U
KACHLOROBENZENE	70	U	60	U	60	U	55	U	13	U
KACHLOROBUTADIENE	70	U	60	U	60	U	55	U	13	U
KACHLOROETHANE	70	U	60	U	60	U	55	U	13	U
TROBENZENE	70	U	60	U	60	U	55	U	13	U
1,2,4-TRICHLOROPHENOL	350	U	300	U	300	U	280	U	65	U
TRICHLOROBENZENE	70	U	60	U	60	U	55	U	13	U

Concentration Units - µg/L - micrograms per liter.

- The analyte was not detected. The minimum quantitation limit for the sample is reported.
- Analyte present; reported as an estimated value.
- = No data qualifier required.

Table D-20
(continued)

Page 11 of 13

Sample ID No.	138-MSC-234	138-MSC-239	138-MSC-241	138-MSC-243	138-MSC-305	138-MSC-308
Well ID No.	B3890C003-2	B3890C003-2	B3890C034	B3890C034	B3890C006-2	B3890C006-2
Sample Depth (ft)	6 - 8	15 - 17.5	2 - 4	6 - 8	2 - 4	6 - 8
Analyte						
-DICHLOROBENZENE	60 U	65 U	60 U	80 U	70 U	60 U
1,2,4-TRICHLOROPHENOL	300 U	320 U	300 U	400 U	350 U	300 U
1,2,6-TRICHLOROPHENOL	60 U	65 U	60 U	80 U	70 U	60 U
-DINITROTOLUENE	60 U	65 U	60 U	80 U	70 U	60 U
ETHYLPHENOL	60 U	65 U	60 U	80 U	70 U	60 U
ETHYLPHENOL	60 U	65 U	14 J	80 U	240 =	60 U
ACHLOROBENZENE	60 U	65 U	60 U	80 U	70 U	60 U
ACHLOROBUTADIENE	60 U	65 U	60 U	80 U	70 U	60 U
ACHLOROETHANE	60 U	65 U	60 U	80 U	70 U	60 U
ROBENZENE	60 U	65 U	60 U	80 U	70 U	60 U
TACHLOROPHENOL	300 U	320 U	300 U	400 U	350 U	300 U
1,1-DICHLOROETHANE	60 U	65 U	60 U	80 U	70 U	60 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
 Analyte present; reported as an estimated value.
 No data qualifier required.

Table D-20
(continued)

Page 12 of 13

Sample ID No.	138-MSC-314	138-MSC-328	138-MSC-074	138-MSC-330	138-MSC-335	138-MSC-336		
Well ID No.	B3890C022-3	B3890C024-1	B3890C007	B3890C024-2	B3890C030-2	B3890C030-2		
Sample Depth (ft)	14 - 16	4 - 6	12 - 14	4 - 6	6.5 - 8.5	8.5 - 10.2		
Analyte								
1,2-DICHLOROBENZENE	60	U	55	U	55	U	60	U
1,3,5-TRICHLOROPHENOL	300	U	280	U	280	U	300	U
1,2,4-TRICHLOROPHENOL	60	U	55	U	55	U	60	U
1,3-DINITROTOLUENE	60	U	55	U	55	U	60	U
1,2-DIETHYLPHENOL	60	U	55	U	55	U	60	U
1,2-DIETHYLPHENOL	60	U	55	U	55	U	60	U
1,2-DICHLOROBENZENE	60	U	55	U	55	U	60	U
1,2-DICHLOROBUTADIENE	60	U	55	U	55	U	60	U
1,2-DICHLOROETHANE	60	U	55	U	55	U	60	U
1,2-DIBROMOBENZENE	60	U	55	U	55	U	60	U
1,2,4-TRICHLOROPHENOL	300	U	280	U	280	U	300	U
1,2-DIBROMODIBENZENE	60	U	55	U	55	U	60	U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.
 Analyte present; reported as an estimated value.
 No data qualifier required.

Table D-20
(continued)

of 13

ID No. e ID No. Depth (ft)	138-MSC-339 83890C010-1 0 - 2	138-MSC-078 83890C024 10 - 12	138-MSC-094 83890C031 12 - 14	138-MSC-100 83890C030 10 - 12
analyte				
CHLOROBENZENE	60 U	60 U	60 U	65 U
DICHLOROPHENOL	300 U	300 U	300 U	320 U
TRICHLOROPHENOL	60 U	60 U	60 U	65 U
NITROTOLUENE	60 U	60 U	60 U	65 U
1,2-DICHLOROPHENOL	60 U	60 U	60 U	65 U
1,4-DICHLOROPHENOL	60 U	60 U	60 U	65 U
1,3-DICHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,4-TRICHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,3-TRICHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,4,5-TETRACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,3,4-TETRACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,3,5-TETRACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,3,6-TETRACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,4,6-TETRACHLOROPHENOL	60 U	60 U	60 U	65 U
1,3,4,6-TETRACHLOROPHENOL	60 U	60 U	60 U	65 U
1,3,5-TRICHLOROPHENOL	60 U	60 U	60 U	65 U
1,3,4,5-TETRACHLOROPHENOL	60 U	60 U	60 U	65 U
1,3,5,6-TETRACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,3,4,5-PENTACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,3,4,6-PENTACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,3,5,6-PENTACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,4,5,6-PENTACHLOROPHENOL	60 U	60 U	60 U	65 U
1,3,4,5,6-PENTACHLOROPHENOL	60 U	60 U	60 U	65 U
1,2,3,4,5,6-HEXACHLOROPHENOL	60 U	60 U	60 U	65 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum quantitation limit for the sample is reported.
 E - analyte present; reported as an estimated value.
 Q - data qualifier required.

Table D-21
TCLP Pesticides,
MISS Onsite Soil Samples

1 of 13

Sample ID No.	138-MSC-002	138-MSC-005	138-MSC-011	138-MSC-012	138-MSC-023	138-MSC-024
Well ID No.	B3890C001	B3890C001	B3890C003-1	B3890C003	B3890C002	B3890C002
Sample Depth (ft)	2 - 4	10 - 12	6 - 8	10 - 12	8 - 10	10 - 12
Analyte						
γ CHLORDANE	1.2 U	1.1 U	1.1 U	1.1 U	1.0 U	1.2 U
δ CHLORDANE	0.24 U	0.22 U	0.21 U	0.22 U	0.21 U	0.23 U
γ CHLORDANE	1.2 U	1.1 U	1.1 U	1.1 U	1.0 U	1.2 U
γ-BHC (LINDANE)	0.12 U	0.11 U	0.11 U	0.11 U	0.10 U	0.12 U
α-CHLOR	0.12 U	0.11 U	0.11 U	0.11 U	0.10 U	0.12 U
β-CHLOR	1.2 U	1.1 U	1.1 U	1.1 U	1.0 U	1.2 U
γ-CHLOR	2.4 U	2.2 U	2.1 U	2.2 U	2.1 U	2.3 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

of 13

ID No.	138-MSC-029	138-MSC-031	138-MSC-032	138-MSC-038	138-MSC-039	138-MSC-044
Site ID No.	B3890C022	B3890C022-1	B3890C022-1	B3890C022-2	B3890C022-2	B3890C004
Depth (ft)	6 - 8	8 - 10	10 - 12	12 - 12.8	13 - 13.9	8 - 10
Analyte						
CHLORDANE	1.2 U	1.2 U	1.2 U	1.3 U	1.1 U	1.1 U
	0.24 U	0.25 U	0.23 U	0.26 U	0.23 U	0.22 U
CHLORDANE	1.2 U	1.2 U	1.2 U	1.3 U	1.1 U	1.1 U
BHC (LINDANE)	0.12 U	0.12 U	0.12 U	0.13 U	0.11 U	0.11 U
DELTA CHLOR	0.12 U	0.12 U	0.12 U	0.13 U	0.11 U	0.11 U
DELTA CHLOR	1.2 U	1.2 U	1.2 U	1.3 U	1.1 U	1.1 U
DELTA CHLOR	2.4 U	2.5 U	2.3 U	2.6 U	2.3 U	2.2 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

Page 3 of 13

Sample ID No.	138-MSC-046	138-MSC-058	138-MSC-059	138-MSC-060	138-MSC-061	138-MSC-065
Well ID No.	B3890C004	B3890C004	B3890C004	B3890C004	B3890C004	B3890C023
Well Depth (ft)	12 - 14	15 - 16.5	16.5 - 17.5	17.5 - 19.5	19.5 - 21.5	6 - 8
Analyte						
γ-HCHLORDANE	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U
γ-HCHLORDANE	0.22 U	0.22 U	0.21 U	0.23 U	0.21 U	0.22 U
γ-HCHLORDANE	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U
γ-HCHLORDANE (LINDANE)	0.11 U	0.11 U	0.11 U	0.12 U	0.11 U	0.11 U
γ-HCHLOR	0.11 U	0.11 U	0.11 U	0.12 U	0.11 U	0.11 U
γ-HCHLOR	1.1 U	1.1 U	1.1 U	1.2 U	1.1 U	1.1 U
γ-HCHLOR	2.2 U	2.2 U	2.1 U	2.3 U	2.1 U	2.2 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

4 of 13

Sample ID No.	138-MSC-067	138-MSC-073	138-MSC-075	138-MSC-080	138-MSC-082	138-MSC-084
Well ID No.	B3890C023	B3890C007	B3890C024	B3890C005	B3890C005	B3890C025
Sample Depth (ft)	12 - 14	0 - 2	4 - 6	2 - 4	14 - 16	2 - 4
Analyte						
CHLORDANE	1.1 U	1.1 U	1.0 U	1.1 U	1.1 U	1.1 U
CHLORDANE	0.22 U	0.22 U	0.20 U	0.23 U	0.23 U	0.23 U
CHLORDANE	1.1 U	1.1 U	1.0 U	1.1 U	1.1 U	1.1 U
-BHC (LINDANE)	0.11 U	0.11 U	0.10 U	0.11 U	0.11 U	0.11 U
CHLOR	0.11 U	0.11 U	0.10 U	0.11 U	0.11 U	0.11 U
XYCHLOR	1.1 U	1.1 U	1.0 U	1.1 U	1.1 U	1.1 U
HENE	2.2 U	2.2 U	2.0 U	2.3 U	2.3 U	2.3 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

5 of 13

Sample ID No.	138-MSC-087	138-MSC-092	138-MSC-099	138-MSC-104	138-MSC-106	138-MSC-114
Well ID No.	B3890C025	B3890C031	B3890C030	B3890C021	B3890C021	B3890C012
Sample Depth (ft)	10 - 12	8 - 10	6 - 8	4 - 6	10 - 12	12 - 14
Analyte						
γ CHLORDANE	1.1 U	1.0 U	1.1 U	1.2 U	0.99 U	1.2 U
δ CHLORDANE	0.23 U	0.21 U	0.21 U	0.24 U	0.20 U	0.24 U
γ CHLORDANE	1.1 U	1.0 U	1.1 U	1.2 U	0.99 U	1.2 U
γ-BHC (LINDANE)	0.11 U	0.10 U	0.11 U	0.12 U	0.099 U	0.12 U
γ-CHLOR	0.11 U	0.10 U	0.11 U	0.12 U	0.099 U	0.12 U
γ-CHLOR	1.1 U	1.0 U	1.1 U	1.2 U	0.99 U	1.2 U
γ-HENE	2.3 U	2.1 U	2.1 U	2.4 U	2.0 U	2.4 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

of 13	138-MSC-117		138-MSC-121		138-MSC-122		138-MSC-124		138-MSC-127		138-MSC-131	
ID No.	B3890C015		B3890C033		B3890C033		B3890C027		B3890C027		B3890C015	
le ID No.	12 - 14		3 - 5		5 - 7		2 - 4		8 - 10		6 - 8	
Depth (ft)												
analyte												
CHLORDANE	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.0	U
	0.22	U	0.22	U	0.23	U	0.23	U	0.22	U	0.20	U
CHLORDANE	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.0	U
BHC (LINDANE)	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	0.10	U
PHLOR	0.11	U	0.11	U	0.11	U	0.11	U	0.11	U	1.0	U
PHYCHLOR	1.1	U	1.1	U	1.1	U	1.1	U	1.1	U	1.0	U
PHENE	2.2	U	2.2	U	2.3	U	2.3	U	2.2	U	2.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

7 of 13

Well ID No. hole ID No. Well Depth (ft)	138-MSC-140 B3890C032 0 - 2	138-MSC-142 B3890C032 4 - 6	138-MSC-144 B3890C010 0 - 2	138-MSC-145 B3890C010 6 - 8	138-MSC-149 B3890C028 6 - 8	138-MSC-150 B3890C028 8 - 11
Analyte						
A CHLORDANE	1.1 U	0.98 U	0.98 U	1.1 U	1.1 U	1.1 U
IN	0.22 U	0.20 U	0.20 U	0.22 U	0.22 U	0.22 U
A CHLORDANE	1.1 U	0.98 U	0.98 U	1.1 U	1.1 U	1.1 U
A-BHC (LINDANE)	0.11 U	0.098 U	0.098 U	0.11 U	0.11 U	0.11 U
ACHLOR	0.11 U	0.098 U	0.098 U	0.11 U	0.11 U	0.11 U
OXYCHLOR	1.1 U	0.98 U	0.98 U	1.1 U	1.1 U	1.1 U
PHENE	2.2 U	2.0 U	2.0 U	2.2 U	2.2 U	2.2 U

Concentration Units - µg/L - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

Sample ID No. Well ID No. Depth (ft)	138-MSC-162 B3890C017 0 - 2	138-MSC-167 B3890C017 12 - 14	138-MSC-169 B3890C018 0 - 2	138-MSC-171 B3890C018 4 - 6	138-MSC-174 B3890C014 2 - 4	138-MSC-178 B3890C014 12 - 14
Analyte						
CHLORDANE	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U
NONACHLOR	0.23 U	0.22 U	0.23 U	0.24 U	0.23 U	0.23 U
CHLORDANE	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U
-BHC (LINDANE)	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.11 U
CHLOR	0.11 U	0.11 U	0.12 U	0.12 U	0.12 U	0.11 U
XYCHLOR	1.1 U	1.1 U	1.2 U	1.2 U	1.2 U	1.1 U
HENE	2.3 U	2.2 U	2.3 U	2.4 U	2.3 U	2.3 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

9 of 13

Well ID No.	138-MSC-183	138-MSC-184	138-MSC-195	138-MSC-196	138-MSC-199	138-MSC-202
Well ID No.	B3890C026	B3890C012	B3890C016	B3890C016	B3890C009	B3890C009
Well Depth (ft)	12 - 14	14 - 16	10 - 12	14 - 16	2 - 4	8 - 10
Analyte						
γ-CHLORDANE	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1.0 U
δ-CHLORDANE	0.21 U	0.21 U	0.23 U	0.25 U	0.21 U	0.20 U
γ-CHLORDANE	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1.0 U
γ-BHC (LINDANE)	0.11 U	0.11 U	0.12 U	0.12 U	0.11 U	0.10 U
γ-CHLOR	0.11 U	0.11 U	0.12 U	0.12 U	0.11 U	0.10 U
δ-CHLOR	1.1 U	1.1 U	1.2 U	1.2 U	1.1 U	1.0 U
γ-HEXACHLOROCYCLOHEXENE	2.1 U	2.1 U	2.3 U	2.5 U	2.1 U	2.0 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

0 of 13

ID No.	138-MSC-206	138-MSC-208	138-MSC-212	138-MSC-215	138-MSC-222	138-MSC-224
Site ID No.	B3890C011	B3890C011	B3890C029	B3890C029	B3890C001-2	B3890C001-2
Depth (ft)	4 - 6	12 - 14	6 - 8	12 - 14	2 - 4	10 - 12
analyte						
CHLORDANE	1.2 U	1.0 U	1.2 U	1.2 U	1.1 U	1.0 U
	0.24 U	0.20 U	0.23 U	0.25 U	0.23 U	0.21 U
CHLORDANE	1.2 U	1.0 U	1.2 U	1.2 U	1.1 U	1.0 U
BHC (LINDANE)	0.12 U	0.10 U	0.12 U	0.12 U	0.11 U	0.10 U
DELTA-HCHLOR	0.12 U	0.10 U	0.12 U	0.12 U	0.11 U	0.10 U
DELTA-GAMMA-HCHLOR	1.2 U	1.0 U	1.2 U	1.2 U	1.1 U	1.0 U
DELTA-HEXACHLOROCYCLOHEXENE	2.4 U	2.0 U	2.3 U	2.5 U	2.3 U	2.1 U

Concentration Units - µg/L - micrograms per liter.

U - analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

11 of 13

Well ID No. Sample ID No. Sample Depth (ft)	138-MSC-234 B3890C003-2 6 - 8	138-MSC-239 B3890C003-2 15 - 17.5	138-MSC-241 B3890C034 2 - 4	138-MSC-243 B3890C034 6 - 8	138-MSC-305 B3890C006-2 2 - 4	138-MSC-308 B3890C006-2 6 - 8
Analyte						
CHLORDANE	1.1 U	1.0 U	1.1 U	1.1 U	5.3 U	5.9 U
NONACHLORDANE	0.21 U	0.20 U	0.22 U	0.21 U	1.1 U	1.2 U
CHLORDANE	1.1 U	1.0 U	1.1 U	1.1 U	5.3 U	5.9 U
-BHC (LINDANE)	0.11 U	0.10 U	0.11 U	0.11 U	0.53 U	0.59 U
CHLOR	0.11 U	0.10 U	0.11 U	0.11 U	0.53 U	0.59 U
POLYCHLOR	1.1 U	1.0 U	1.1 U	1.1 U	5.3 U	5.9 U
HEXACHLOR	2.1 U	2.0 U	2.2 U	2.1 U	11 U	12 U

Concentration Units - µg/L - micrograms per liter.

If an analyte was not detected, The minimum quantitation on limit for the sample is reported.

Table D-21
(continued)

Well ID No. Sample ID No. Depth (ft)	138-MSC-314 B3890C022-3 14 - 16	138-MSC-328 B3890C024-1 4 - 6	138-MSC-330 B3890C024-2 10 - 14	138-MSC-335 B3890C030-2 6 - 8	138-MSC-336 B3890C030-2 10 - 14	138-MSC-339 B3890C010-1 0 - 2
Analyte						
CHLORDANE	1.2 U	1.0 U	1.1 U	1.0 U	1.1 U	1.1 U
γ-CHLORDANE	0.23 U	0.21 U	0.22 U	0.21 U	0.22 U	0.22 U
CHLORDANE (-BHC (LINDANE))	1.2 U	1.0 U	1.1 U	1.0 U	1.1 U	1.1 U
CHLOR	0.12 U	0.10 U	0.11 U	0.10 U	0.11 U	0.11 U
XYCHLOR	0.12 U	0.10 U	0.11 U	0.10 U	0.11 U	0.11 U
HENE	1.2 U	1.0 U	1.1 U	1.0 U	1.1 U	1.1 U
	2.3 U	2.1 U	2.2 U	2.1 U	2.2 U	2.2 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-21
(continued)

Well ID No. hole ID No. Well Depth (ft)	138-MSC-074 B3890C007 14 - 16	138-MSC-078 B3890C024 10 - 12	138-MSC-094 B3890C031 12 - 14	138-MSC-100 B3890C030 10 - 12
Analyte				
ALDRIANE	1.1 U	1.1 U	1.0 U	1.1 U
IN	0.21 U	0.22 U	0.20 U	0.21 U
ALDRIANE	1.1 U	1.1 U	1.0 U	1.1 U
AL-BHC (LINDANE)	0.11 U	0.11 U	0.10 U	0.11 U
ACHLOR	0.11 U	0.11 U	0.10 U	0.11 U
OXYCHLOR	1.1 U	1.1 U	1.0 U	1.1 U
PHENE	2.1 U	2.2 U	2.0 U	2.1 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table D-22
 TCLP - Herbicides,
 MISS Onsite Soil Samples

Page 1 of 13

Sample ID No.	138-MSC-002	138-MSC-005	138-MSC-011	138-MSC-012	138-MSC-023	138-MSC-024
Borehole ID No.	B3890C001	B3890C001	B3890C003-1	B3890C003	B3890C002	B3890C002
Sample Depth (ft)	2 - 4	10 - 12	6 - 8	10 - 12	8 - 10	10 - 12
Analyte						
2,4,5-TP (SILVEX)	1.1 U	0.98 U	1.2 U	1.1 U	0.96 U	1.0 U
2,4-D	2.3 U	2.0 U	2.3 U	2.1 U	1.9 U	2.0 U

Concentration Units - µg/L - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 2 of 13

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-029 B3890C022 6 - 8	138-MSC-031 B3890C022-1 8 - 10	138-MSC-032 B3890C022-1 10 - 12	138-MSC-038 B3890C022-2 12 - 12.8	138-MSC-039 B3890C022-2 13 - 13.9	138-MSC-044 B3890C004 8 - 10
Analyte						
2,4,5-TP (SILVEX)	0.98 U	0.98 U	0.98 U	1.0 U	0.96 U	0.96 U
2,4-D	2.0 U	2.0 U	2.0 U	2.0 U	1.9 U	1.9 U

Concentration Units - $\mu\text{g/l}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 3 of 13

Sample ID No.	138-MSC-046	138-MSC-058	138-MSC-059	138-MSC-060	138-MSC-061	138-MSC-065
Borehole ID No.	B3890C004	B3890C004	B3890C004	B3890C004	B3890C004	B3890C023
Sample Depth (ft)	12 - 14	15 - 16.5	16.5 - 17.5	17.5 - 19.5	19.5 - 21.5	6 - 8
Analyte						
2,4,5-TP (SILVEX)	0.96 U	1.1 U	1.1 U	1.0 U	1.1 U	1.1 U
2,4-D	1.9 U	2.3 U	2.1 U	2.1 U	2.2 U	2.2 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 4 of 13

Sample ID No.	138-MSC-067	138-MSC-073	138-MSC-075	138-MSC-080	138-MSC-082	138-MSC-084
Borehole ID No.	B3890C023	B3890C007	B3890C024	B3890C005	B3890C005	B3890C025
Sample Depth (ft)	12 - 14	0 - 2	4 - 6	2 - 4	14 - 16	2 - 4
Analyte						
2,4,5-TP (SILVEX)	1.0 U	1.2 U	1.1 U	1.1 U	1.1 U	1.2 U
2,4-D	2.1 U	2.4 U	2.2 U	2.2 U	2.1 U	2.3 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 5 of 13

Sample ID No.	138-MSC-087	138-MSC-092	138-MSC-099	138-MSC-104	138-MSC-106	138-MSC-114
Borehole ID No.	B3890C025	B3890C031	B3890C030	B3890C021	B3890C021	B3890C012
Sample Depth (ft)	10 - 12	8 - 10	6 - 8	4 - 6	10 - 12	12 - 14
Analyte						
2,4,5-TP (SILVEX)	1.0 U	1.1 U	1.0 U	1.1 U	1.1 U	1.1 U
2,4-D	2.0 U	2.1 U	2.0 U	2.1 U	2.3 U	2.1 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 6 of 13

Sample ID No.	138-MSC-117	138-MSC-121	138-MSC-122	138-MSC-124	138-MSC-127	138-MSC-131
Borehole ID No.	B3890C015	B3890C033	B3890C033	B3890C027	B3890C027	B3890C015
Sample Depth (ft)	12 - 14	3 - 5	5 - 7	2 - 4	8 - 10	6 - 8
Analyte						
2,4,5-TP (SILVEX)	1.1 U	1.2 U	1.1 U	1.2 U	1.1 U	1.1 U
2,4-D	2.2 U	2.4 U	2.2 U	2.4 U	2.2 U	2.2 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 7 of 13

Sample ID No.	138-MSC-140	138-MSC-142	138-MSC-144	138-MSC-145	138-MSC-149	138-MSC-150						
Borehole ID No.	B3890C032	B3890C032	B3890C010	B3890C010	B3890C028	B3890C028						
Sample Depth (ft)	0 - 2	4 - 6	0 - 2	6 - 8	6 - 8	8 - 11						
Analyte												
2,4,5-TP (SILVEX)	0.96	U	1.0	U	1.1	U	1.0	U	1.0	U	1.1	U
2,4-D	1.9	U	2.1	U	2.1	U	2.1	U	2.0	U	2.2	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 8 of 13

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-162 B3890C017 0 - 2	138-MSC-167 B3890C017 12 - 14	138-MSC-169 B3890C018 0 - 2	138-MSC-171 B3890C018 4 - 6	138-MSC-174 B3890C014 2 - 4	138-MSC-178 B3890C014 12 - 14
Analyte						
2,4,5-TP (SILVEX)	1.1 U	1.0 U	1.1 U	1.1 U	1.1 U	1.1 U
2,4-D	2.2 U	2.1 U	2.2 U	2.2 U	2.1 U	2.2 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 9 of 13

Sample ID No.	138-MSC-183	138-MSC-184	138-MSC-195	138-MSC-196	138-MSC-199	138-MSC-202
Borehole ID No.	B3890C026	B3890C012	B3890C016	B3890C016	B3890C009	B3890C009
Sample Depth (ft)	12 - 14	14 - 16	10 - 12	14 - 16	2 - 4	8 - 10
Analyte						
2,4,5-TP (SILVEX)	1.0 U	1.1 U	1.1 U	1.2 U	1.2 U	1.0 U
2,4-D	2.0 U	2.2 U	2.2 U	2.4 U	2.3 U	2.1 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 10 of 13

Sample ID No.	138-MSC-206	138-MSC-208	138-MSC-212	138-MSC-215	138-MSC-222	138-MSC-224
Borehole ID No.	B3890C011	B3890C011	B3890C029	B3890C029	B3890C001-2	B3890C001-2
Sample Depth (ft)	4 - 6	12 - 14	6 - 8	12 - 14	2 - 4	10 - 12
Analyte						
2,4,5-TP (SILVEX)	1.1 U	1.0 U	1.2 U	1.2 U	1.1 U	1.1 U
2,4-D	2.2 U	2.0 U	0.31 JB	2.4 U	2.2 U	2.1 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

J - Analyte present; reported as an estimated value.

B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 11 of 13

Sample ID No.	138-MSC-234	138-MSC-239	138-MSC-241	138-MSC-243	138-MSC-305	138-MSC-308
Borehole ID No.	B3890C003-2	B3890C003-2	B3890C034	B3890C034	B3890C006-2	B3890C006-2
Sample Depth (ft)	6 - 8	15 - 17.5	2 - 4	6 - 8	2 - 4	6 - 8
Analyte						
2,4,5-TP (SILVEX)	1.1 U	1.0 U	1.0 U	1.0 U	1.4 U	1.3 U
2,4-D	2.1 U	2.0 U	2.1 U	2.1 U	2.7 U	2.6 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 12 of 13

Sample ID No.	138-MSC-314	138-MSC-328	138-MSC-330	138-MSC-335	138-MSC-336	138-MSC-339
Borehole ID No.	B3890C022-3	B3890C024-1	B3890C024-2	B3890C030-2	B3890C030-2	B3890C010-1
Sample Depth (ft)	14 - 16	4 - 6	10 - 14	6 - 8	10 - 14	0 - 2
Analyte						
2,4,5-TP (SILVEX)	1.1 U	1.2 U	1.0 U	1.1 U	1.2 U	1.4 U
2,4-D	2.2 U	2.5 U	2.0 U	2.2 U	2.4 U	2.7 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - The analyte is found in the associated blank as well as in the sample.

Table D-22
(continued)

Page 13 of 13

Sample ID No.	138-MSC-074	138-MSC-078	138-MSC-094	138-MSC-100
Borehole ID No.	B3890C007	B3890C024	B3890C031	B3890C030
Sample Depth (ft)	14 - 16	10 - 12	12 - 14	10 - 12
Analyte				
2,4,5-TP (SILVEX)	1.1 U	1.1 U	1.1 U	1.1 U
2,4-D	2.2 U	2.2 U	2.2 U	2.2 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

J - Analyte present; reported as an estimated value.

B - The analyte is found in the associated blank as well as in the sample.

Table D-23
Corrosivity - Reactivity,
MISS Onsite Soil Samples

Page 1 of 12

Sample ID No.	138-MSC-005	138-MSC-006	138-MSC-012	138-MSC-013	138-MSC-024	138-MSC-025
Borehole ID No.	B3890C001	B3890C001	B3890C003-1	B3890C003-1	B3890C002	B3890C002
Sample Depth (ft)	10 - 12	0 - 10	10 - 12	0 - 12	10 - 12	0 - 8
Analyte						
Corrosivity by pH	7.8 =	8.6 =	6.4 =	7.4 =	6.1 =	7.7 =
Cyanide, Total	1.1 R	1.2 U	1.1 R	1.1 U	0.58 U	1.3 U
Sulfide	0.27 U	0.29 U	0.57 U	0.29 U	0.29 U	0.32 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
 - pH units for pH.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.
 R - Unreliable result. Analyte may or may not be present in the sample.
 NR - Analysis not requested.

Table D-23
(continued)

Page 2 of 12

Sample ID No.	138-MSC-028	138-MSC-031	138-MSC-032	138-MSC-038	138-MSC-039	138-MSC-046
Borehole ID No.	B3890C022	B3890C022-1	B3890C022-1	B3890C022-2	B3890C022-2	B3890C004
Sample Depth (ft)	4 - 6	8 - 10	10 - 12	12 - 12.8	13 - 13.9	12 - 14
Analyte						
Corrosivity by pH	12.1 =	6.4 =	6.6 =	7.3 =	7.2 =	6.8 =
Cyanide, Total	1.2 U	0.60 U	0.59 U	0.56 U	4.6 U	0.58 U
Sulfide	0.29 U	0.30 U	0.30 U	0.28 U	0.28 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.
R - Unreliable result. Analyte may or may not be present in the sample.
NR - Analysis not requested.

Table D-23

(continued)

Page 3 of 12

Sample ID No.	138-MSC-047	138-MSC-058	138-MSC-059	138-MSC-060	138-MSC-061	138-MSC-066
Borehole ID No.	B3890C004	B3890C004	B3890C004	B3890C004	B3890C004	B3890C023
Sample Depth (ft)	0 - 10	15 - 16.5	16.5 - 17.5	17.5 - 19.5	19.5 - 21.5	0 - 8
<hr/>						
Analyte						
Corrosivity by pH	7.5 =	7.1 =	9.0 =	8.0 =	7.6 =	7.0 =
Cyanide, Total	1.4 U	0.62 U	0.57 U	0.54 U	0.57 U	1.3 U
Sulfide	0.36 U	0.31 U	0.29 U	0.27 U	0.28 U	0.32 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
 - pH units for pH.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- = - No data qualifier required.
- R - Unreliable result. Analyte may or may not be present in the sample.
- NR - Analysis not requested.

Table D-23
(continued)

Page 4 of 12

Sample ID No.	138-MSC-067	138-MSC-076	138-MSC-081	138-MSC-082	138-MSC-086	138-MSC-087
Borehole ID No.	B3890C023	B3890C024	B3890C005	B3890C005	B3890C025	B3890C025
Sample Depth (ft)	12 - 14	0 - 8	4 - 6	14 - 16	0 - 8	10 - 12
<hr/>						
Analyte						
Corrosivity by pH	7.3 =	7.2 =	7.2 =	9.0 =	7.0 =	7.3 =
Cyanide, Total	0.57 U	1.4 U	1.2 U	0.61 U	1.4 U	0.67 U
Sulfide	0.28 U	0.36 U	0.30 U	0.30 U	0.35 U	0.34 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.
R - Unreliable result. Analyte may or may not be present in the sample.
NR - Analysis not requested.

Table D-23
(continued)

Page 5 of 12

Sample ID No.	138-MSC-095	138-MSC-101	138-MSC-106	138-MSC-107	138-MSC-116	138-MSC-122
Borehole ID No.	B3890C031	B3890C030	B3890C021	B3890C021	B3890C012	B3890C033
Sample Depth (ft)	0 - 10	0 - 8	10 - 12	0 - 8	0 - 13.5	5 - 7
Analyte						
Corrosivity by pH	7.1 =	7.6 =	7.0 =	7.1 =	7.1 =	7.6 =
Cyanide, Total	1.4 U	1.4 U	0.58 U	1.2 U	1.6 U	0.54 U
Sulfide	0.34 U	0.36 U	0.29 U	0.29 U	0.40 U	0.27 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- = - No data qualifier required.
- R - Unreliable result. Analyte may or may not be present in the sample.
- NR - Analysis not requested.

Table D-23
(continued)

Page 6 of 12

Sample ID No.	138-MSC-126	138-MSC-127	138-MSC-133	138-MSC-134	138-MSC-142	138-MSC-143
Borehole ID No.	B3890C027	B3890C027	B3890C015	B3890C033	B3890C032	B3890C032
Sample Depth (ft)	0 - 7	8 - 10	0 - 11	0 - 3	4 - 6	0 - 3
Analyte						
Corrosivity by pH	7.4 =	7.0 =	7.1 =	7.5 =	7.3 =	7.4 =
Cyanide, Total	1.2 U	0.58 U	1.7 U	1.2 U	0.57 U	1.2 U
Sulfide	0.30 U	0.29 U	0.44 U	0.29 U	0.28 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- = - No data qualifier required.
- R - Unreliable result. Analyte may or may not be present in the sample.
- NR - Analysis not requested.

Table D-23
(continued)

Page 7 of 12

Sample ID No.	138-MSC-145	138-MSC-150	138-MSC-151	138-MSC-167	138-MSC-168	138-MSC-171
Borehole ID No.	B3890C010	B3890C028	B3890C028	B3890C017	B3890C017	B3890C018
Sample Depth (ft)	6 - 8	8 - 11	0 - 8	12 - 14	0 - 9	4 - 6
Analyte						
Corrosivity by pH	7.2 =	7.7 =	9.6 =	7.5 =	5.2 =	NR
Cyanide, Total	0.57 U	0.55 U	1.1 U	1.1 U	1.1 U	1.1 U
Sulfide	0.29 U	0.27 U	0.28 U	0.28 U	0.28 U	NR

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.
R - Unreliable result. Analyte may or may not be present in the sample.
NR - Analysis not requested.

Table D-23
(continued)

Page 8 of 12

Sample ID No.	138-MSC-172	138-MSC-178	138-MSC-179	138-MSC-182	138-MSC-183	138-MSC-184
Borehole ID No.	B3890C018	B3890C014	B3890C014	B3890C026	B3890C026	B3890C012
Sample Depth (ft)	0 - 2.5	12 - 14	0 - 10	0 - 8	12 - 14	14 - 16
Analyte						
Corrosivity by pH	6.0 =	9.1 =	7.6 =	9.0 =	7.6 =	8.2 =
Cyanide, Total	1.2 U	1.1 U	1.1 U	2.6 U	1.6 U	1.1 U
Sulfide	0.30 U	0.28 U	0.28 U	0.65 U	0.39 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- = - No data qualifier required.
- R - Unreliable result. Analyte may or may not be present in the sample.
- NR - Analysis not requested.

Table D-23
(continued)

Page 9 of 12

Sample ID No.	138-MSC-196	138-MSC-197	138-MSC-202	138-MSC-203	138-MSC-207	138-MSC-208
Borehole ID No.	B3890C016	B3890C016	B3890C009	B3890C009	B3890C011	B3890C011
Sample Depth (ft)	14 - 16	0 - 12	8 - 10	0 - 8	0 - 6.5	12 - 14
Analyte						
Corrosivity by pH	8.4 =	7.3 =	7.1 =	7.2 =	6.9 =	9.0 =
Cyanide, Total	1.1 U	1.8 U	1.2 U	1.1 U	1.6 U	1.2 U
Sulfide	0.29 U	0.45 U	0.30 U	0.28 U	0.40 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.
R - Unreliable result. Analyte may or may not be present in the sample.
NR - Analysis not requested.

Table D-23
(continued)

Page 10 of 12

Sample ID No.	138-MSC-215	138-MSC-224	138-MSC-225	138-MSC-238	138-MSC-239	138-MSC-243
Borehole ID No.	B3890C029	B3890C001-2	B3890C001-2	B3890C003-2	B3890C003-2	B3890C034
Sample Depth (ft)	12 - 14	10 - 12	0 - 8	0 - 12	15 - 17.5	6 - 8
Analyte						
Corrosivity by pH	7.3 =	8.6 =	8.1 =	7.4 =	9.0 =	7.6 =
Cyanide, Total	1.4 U	0.53 U	1.1 U	1.2 U	0.52 U	0.59 U
Sulfide	0.35 U	0.54 U	0.28 U	0.30 U	0.26 U	0.30 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.
R - Unreliable result. Analyte may or may not be present in the sample.
NR - Analysis not requested.

Table D-23
(continued)

Page 11 of 12

Sample ID No.	138-MSC-244	138-MSC-285	138-MSC-290	138-MSC-292	138-MSC-306	138-MSC-308
Borehole ID No.	B3890C034	B3890C020	B3890C019	B3890C008-1	B3890C006-2	B3890C006-2
Sample Depth (ft)	2 - 4	0 - 4.5	0 - 4.5	0 - 12	2 - 4	6 - 8
Analyte						
Corrosivity by pH	8.0 =	7.4 =	7.2 =	7.4 =	8.5 =	7.2 =
Cyanide, Total	1.3 U	1.4 U	1.4 U	1.1 U	1.3 U	1.9 U
Sulfide	0.32 U	0.35 U	0.35 U	0.28 U	0.34 U	0.46 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
- pH units for pH.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.
R - Unreliable result. Analyte may or may not be present in the sample.
NR - Analysis not requested.

Table D-23
(continued)

Page 12 of 12

	138-MSC-314	138-MSC-325	138-MSC-330	138-MSC-331	138-MSC-336	138-MSC-337	138-MSC-339	138-MSC-340
Sample ID No.	B3890C022-3	B3890C028-1	B3890C024-2	B3890C024-2	B3890C030-2	B3890C030-2	B3890C010-1	B3890C010-1
Borehole ID No.								
Sample Depth (ft)	14 - 16	0 - 8	10 - 14	0 - 8	10 - 14	0 - 8	4 - 8	0 - 2
Analyte								
Corrosivity by pH	NR	7.8 =	7.2 =	6.9 =	6.9 =	7.7 =	7.3 =	9.7 =
Cyanide, Total	1.2 R	1.1 U	1.1 R	1.4 U	1.1 R	1.2 U	1.1 R	1.2 U
Sulfide	0.30 U	0.27 U	0.28 U	0.36 U	0.28 U	0.30 U	0.28 U	0.30 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide).
 - pH units for pH.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.
 R - Unreliable result. Analyte may or may not be present in the sample.
 NR - Analysis not requested.

Table D-24
Mobile Ions,
MISS Onsite Soil Samples

Page 1 of 17

Sample ID No.	138-MSC-003	138-MSC-005	138-MSC-006	138-MSC-007	138-MSC-008	138-MSC-012
Borehole ID No.	B3890C001	B3890C001	B3890C001	B3890C001-1	B3890C003	B3890C003-1
Sample Depth (ft)	4 - 6	10 - 12	0 - 10	4 - 6	0 - 2	10 - 12
<hr/>						
Analyte						
% Solids	86.0 =	91.7 =	86.9 =	87.5 =	83.9 =	87.2 =
Chloride ^a	NR	NR	28.8 U	NR	NR	NR
Nitrate, as N ^a	NR	NR	1.6 =	NR	NR	NR
Phosphate, as P ^a	NR	NR	1040 =	NR	NR	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 2 of 17

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-013 B3890C003-1 0 - 10	138-MSC-021 B3890C002 4 - 6	138-MSC-024 B3890C002 10 - 12	138-MSC-025 B3890C002 0 - 8	138-MSC-028 B3890C022 4 - 6	138-MSC-031 B3890C022-1 8 - 10
Analyte						
% Solids ^a	85.5 =	74.7 =	86.0 =	77.6 =	69.8 =	82.6 =
Chloride	29.2 U	NR	NR	32.2 U	29.3 U	NR
Nitrate, as N ^a	1.5 =	NR	NR	1.3 U	1.2 U	NR
Phosphate, as P ^a	1860 =	NR	NR	7020 =	10700 =	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 3 of 17

Sample ID No.	138-MSC-032	138-MSC-038	138-MSC-039	138-MSC-043	138-MSC-046	138-MSC-047
Borehole ID No.	B3890C022-1	B3890C022-2	B3890C022-2	B3890C004	B3890C004	B3890C004
Sample Depth (ft)	10 - 12	12 - 12.8	13 - 13.9	6 - 8	12 - 14	0 - 10
Analyte						
% Solids	83.7 =	88.2 =	88.7 =	82.6 =	85.0 =	70.4 =
Chloride ^a	NR	NR	NR	NR	NR	35.5 U
Nitrate, as N ^a	NR	NR	NR	NR	NR	1.8 =
Phosphate, as P ^a	NR	NR	NR	NR	NR	9510 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 4 of 17

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-058 B3890C004 15 - 16.5	138-MSC-059 B3890C004 16.5 - 17.5	138-MSC-060 B3890C004 17.5 - 19.5	138-MSC-061 B3890C004 19.5 - 21.5	138-MSC-062 B3890C023 0 - 2	138-MSC-066 B3890C023 0 - 8
Analyte						
% Solids	80.6 =	86.9 =	91.7 =	88.0 =	65.9 =	78.7 =
Chloride ^a	NR	NR	NR	NR	NR	31.8 U
Nitrate, as N ^a	NR	NR	NR	NR	NR	0.64 U
Phosphate, as P ^a	NR	NR	NR	NR	NR	7770 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 5 of 17

Sample ID No.	138-MSC-067	138-MSC-074	138-MSC-076	138-MSC-077	138-MSC-078	138-MSC-079
Borehole ID No.	B3890C023	B3890C007	B3890C024	B3890C024	B3890C024	B3890C005
Sample Depth (ft)	12 - 14	14 - 16	0 - 8	6 - 8	10 - 12	0 - 2
Analyte						
% Solids	87.7 =	83.6 =	70.1 =	62.4 =	87.1 =	90.4 =
Chloride ^a	NR	NR	35.7 U	NR	NR	NR
Nitrate, as N ^a	NR	NR	1.4 U	NR	NR	NR
Phosphate, as P ^a	NR	NR	11200 =	NR	NR	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 6 of 17

Sample ID No.	138-MSC-081	138-MSC-082	138-MSC-086	138-MSC-087	138-MSC-093	138-MSC-094
Borehole ID No.	B3890C005	B3890C005	B3890C025	B3890C025	B3890C031	B3890C031
Sample Depth (ft)	4 - 6	14 - 16	0 - 8	10 - 12	10 - 12	12 - 14
Analyte						
% Solids	84.1 =	82.3 =	72.4 =	74.2 =	65.9 =	82.8 =
Chloride ^a	29.7 U	NR	34.6 U	NR	NR	NR
Nitrate, as N ^a	0.60 U	NR	0.69 U	NR	NR	NR
Phosphate, as P ^a	26500 =	NR	6400 =	NR	NR	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 7 of 17

Sample ID No.	138-MSC-095	138-MSC-098	138-MSC-100	138-MSC-101	138-MSC-105	138-MSC-106
Borehole ID No.	B3890C031	B3890C030	B3890C030	B3890C030	B3890C021	B3890C021
Sample Depth (ft)	0 - 10	4 - 6	10 - 12	0 - 8	6 - 8	10 - 12
Analyte						
% Solids	73.1 =	89.6 =	91.0 =	70.4 =	51.5 =	85.3 =
Chloride ^a	34.2 U	NR	NR	35.5 U	NR	NR
Nitrate, as N ^a	0.68 U	NR	NR	2.2 =	NR	NR
Phosphate, as P ^a	25600 =	NR	NR	28900 =	NR	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 8 of 17

Sample ID No.	138-MSC-107	138-MSC-113	138-MSC-116	138-MSC-122	138-MSC-126	138-MSC-127
Borehole ID No.	B3890C021	B3890C012	B3890C012	B3890C033	B3890C027	B3890C027
Sample Depth (ft)	0 - 8	10 - 12	0 - 13.5	5 - 7	0 - 7	8 - 10
Analyte						
% Solids	86.2 =	53.4 =	62.9 =	91.4 =	82.6 =	86.3 =
Chloride ^a	29.0 U	NR	39.8 U	NR	NR	60.6 U
Nitrate, as N ^a	1.4 =	NR	0.80 U	NR	NR	3.6 =
Phosphate, as P ^a	7670 =	NR	5850 =	NR	NR	1140 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 9 of 17

Sample ID No.	138-MSC-133	138-MSC-134	138-MSC-142	138-MSC-143	138-MSC-145	138-MSC-150
Borehole ID No.	83890C015	83890C033	83890C032	83890C032	83890C010	83890C028
Sample Depth (ft)	10 - 12	0 - 3	4 - 6	0 - 3	6 - 8	8 - 11
Analyte						
% Solids	57.2 =	86.9 =	87.6 =	86.8 =	87.3 =	91.6 =
Chloride ^a	87.4 U	57.6 U	NR	57.6 U	NR	NR
Nitrate, as N ^a	0.87 U	0.58 U	NR	5.1 =	NR	NR
Phosphate, as P ^a	8930 =	387 =	NR	4320 =	NR	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 10 of 17

Sample ID No.	138-MSC-151	138-MSC-167	138-MSC-168	138-MSC-171	138-MSC-172	138-MSC-178
Borehole ID No.	B3890C028	B3890C017	B3890C017	B3890C018	B3890C018	B3890C014
Sample Depth (ft)	0 - 8	12 - 14	0 - 9	4 - 6	0 - 2.5	12 - 14
<hr/>						
Analyte						
% Solids	92.7 =	91.0 =	89.0 =	88.4 =	84.6 =	88.3 =
Chloride ^a	53.9 U	NR	56.2 U	NR	59.1 U	NR
Nitrate, as N ^a	0.54 U	NR	0.56 U	NR	0.59 U	NR
Phosphate, as P ^a	315 =	NR	415 =	NR	729 =	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 11 of 17

Sample ID No.	138-MSC-179	138-MSC-180	138-MSC-182	138-MSC-183	138-MSC-184	138-MSC-196
Borehole ID No.	83890C014	83890C026	83890C026	83890C026	83890C012	83890C016
Sample Depth (ft)	0 - 10	0 - 2	0 - 8	12 - 14	14 - 16	14 - 16
Analyte						
% Solids	89.6 =	45.2 =	38.5 =	63.8 =	89.3 =	87.6 =
Chloride ^a	27.9 U	NR	130 U	NR	NR	NR
Nitrate, as N ^a	1.1 U	NR	0.86 U	NR	NR	NR
Phosphate, as P ^a	10600 =	NR	7130 =	NR	NR	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 12 of 17

Sample ID No.	138-MSC-197	138-MSC-202	138-MSC-203	138-MSC-207	138-MSC-208	138-MSC-215
Borehole ID No.	B3890C016	B3890C009	B3890C009	B3890C011	B3890C011	B3890C029
Sample Depth (ft)	0 - 12	8 - 10	0 - 8	0 - 6.5	12 - 14	12 - 14
Analyte						
% Solids	55.7 =	82.9 =	91.0 =	62.4 =	86.1 =	71.7 =
Chloride ^a	41.8 U	NR	55.0 U	209 =	NR	NR
Nitrate, as N ^a	1.8 U	NR	0.55 U	0.80 U	NR	NR
Phosphate, as P ^a	58100 =	NR	941 =	2710 =	NR	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24

(continued)

Page 13 of 17

Sample ID No.	138-MSC-223	138-MSC-224	138-MSC-225	138-MSC-231	138-MSC-238	138-MSC-239
Borehole ID No.	B3890C001-2	B3890C001-2	B3890C001-2	B3890C003-2	B3890C003-2	B3890C003-2
Sample Depth (ft)	4 - 6	10 - 12	0 - 8	0 - 2	0 - 12	15 - 17.5
Analyte						
% Solids	88.4 =	93.3 =	90.4 =	81.7 =	84.2 =	96.8 =
Chloride ^a	NR	NR	13.8 U	NR	16.4 =	NR
Nitrate, as N ^a	NR	NR	1.3 =	NR	1.7 =	NR
Phosphate, as P ^a	NR	NR	2270 =	NR	3140 =	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 14 of 17

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MSC-243 B3890C034 6 - 8	138-MSC-244 B3890C034 0 - 4	138-MSC-272 B3890C013 12 - 14	138-MSC-274 B3890C008-1 0 - 2	138-MSC-280 B3890C020 0 - 2	138-MSC-284 B3890C020 8 - 10
Analyte						
% Solids	84.4 =	78.4 =	89.8 =	80.0 =	88.3 =	85.8 =
Chloride ^a	NR	207 =	NR	NR	NR	NR
Nitrate, as N ^a	NR	5.6 =	NR	NR	NR	NR
Phosphate, as P ^a	NR	367 =	NR	NR	NR	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 15 of 17

Sample ID No.	138-MSC-285	138-MSC-289	138-MSC-290	138-MSC-291	138-MSC-292	138-MSC-306
Borehole ID No.	B3890C020	B3890C019	B3890C019	B3890C008-1	B3890C008-1	B3890C006-2
Sample Depth (ft)	0 - 4.5	6 - 8	0 - 4.5	14 - 16	0 - 12	2 - 4
Analyte						
% Solids	71.1 =	63.8 =	71.7 =	90.2 =	88.4 =	75.4 =
Chloride ^a	17.6 U	NR	17.4 U	NR	28.3 U	33.1 U
Nitrate, as N ^a	1.4 U	NR	3.7 =	NR	1.1 U	1.3 U
Phosphate, as P ^a	4070 =	NR	2190 =	NR	1640 =	1050 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 16 of 17

Sample ID No.	138-MSC-308	138-MSC-314	138-MSC-320	138-MSC-324	138-MSC-325	138-MSC-329
Borehole ID No.	B3890C006-2	B3890C022-3	B3890C015-1	B3890C028-1	B3890C028-1	B3890C024-2
Sample Depth (ft)	6 - 8	14 - 16	12 - 14	6 - 8	0 - 8	6 - 8
Analyte						
% Solids	95.5 =	83.1 =	82.3 =	87.4 =	93.7 =	64.1 =
Chloride ^a	NR	60.2 U	NR	NR	26.7 U	NR
Nitrate, as N ^a	NR	1.2 U	NR	NR	1.8 =	NR
Phosphate, as P ^a	NR	3210 =	NR	NR	435 =	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-24
(continued)

Page 17 of 17

Sample ID No.	138-MSC-330	138-MSC-331	138-MSC-334	138-MSC-336	138-MSC-337	138-MSC-339	138-MSC-340
Borehole ID No.	B3890C024-2	B3890C024-2	B3890C030-1	B3890C030-2	B3890C030-2	B3890C010-1	B3890C010-1
Sample Depth (ft)	10 - 14	0 - 8	4 - 6	10 - 14	0 - 8	4 - 8	0 - 2
Analyte							
% Solids	88.9 =	70.2 =	78.5 =	89.8 =	82.3 =	89.0 =	83.8 =
Chloride ^a	NR	35.6 U	NR	NR	15.2 U	29.9 U	NR
Nitrate, as N ^a	NR	1.4 U	NR	NR	0.61 U	24.3 =	NR
Phosphate, as P ^a	NR	7040 =	NR	NR	10100 =	866 =	NR

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table D-25
Downhole Gamma Logging Results
MISS Onsite

Page 1 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890C008^d</u>			
9230	9769	0.5	22000
9230	9769	1.0	25000
9230	9769	1.5	20000
9230	9769	2.0	18000
9230	9769	2.5	15000
9230	9769	3.0	15000
9230	9769	3.5	14000
9230	9769	4.0	12000
9230	9769	4.5	12000
9230	9769	5.0	11000
9230	9769	5.5	11000
9230	9769	6.0	11000
9230	9769	6.5	11000
9230	9769	7.0	10000
9230	9769	7.5	9000
9230	9769	8.0	9000
9230	9769	8.5	8000
9230	9769	9.0	8000
9230	9769	9.5	7000
9230	9769	10.0	8000
9230	9769	10.5	8000
9230	9769	11.0	9000
9230	9769	11.5	10000
9230	9769	12.0	10000
9230	9769	12.5	10000
9230	9769	13.0	9000
9230	9769	13.5	10000
9230	9769	14.0	9000
9230	9769	14.5	9000
9230	9769	15.0	10000
9230	9769	15.5	10000
9230	9769	16.0	10000
9230	9769	16.5	11000
9230	9769	17.0	10000
9230	9769	17.5	10000
9230	9769	18.0	11000
9230	9769	18.5	10000
9230	9769	19.0	10000
9230	9769	19.5	10000

Table D-25
(continued)

Page 2 of 36

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890C008-1</u>			
9280	9703	0.5	31000
9280	9703	1.0	33000
9280	9703	1.5	29000
9280	9703	2.0	28000
9280	9703	2.5	29000
9280	9703	3.0	29000
9280	9703	3.5	28000
9280	9703	4.0	32000
9280	9703	4.5	29000
9280	9703	5.0	21000
9280	9703	5.5	18000
9280	9703	6.0	19000
9280	9703	6.5	19000
9280	9703	7.0	22000
9280	9703	7.5	32000
9280	9703	8.0	25000
9280	9703	8.5	14000
9280	9703	9.0	10000
9280	9703	9.5	5000
9280	9703	10.0	3000
9280	9703	10.5	2000
9280	9703	11.0	3000
9280	9703	11.5	6000
9280	9703	12.0	8000
9280	9703	12.5	8000
9280	9703	13.0	9000
9280	9703	13.5	9000
9280	9703	14.0	10000
9280	9703	14.5	10000
9280	9703	15.0	10000
9280	9703	15.5	10000
9280	9703	16.0	10000
<u>Borehole B3890C013</u>			
9352	9566	0.5	14000
9352	9566	1.0	19000
9352	9566	1.5	20000
9352	9566	2.0	19000
9352	9566	2.5	19000
9352	9566	3.0	18000

Table D-25
(continued)

Page 3 of 36

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890C013 (continued)

9352	9566	3.5	18000
9352	9566	4.0	16000
9352	9566	4.5	16000
9352	9566	5.0	17000
9352	9566	5.5	19000
9352	9566	6.0	22000
9352	9566	6.5	28000
9352	9566	7.0	23000
9352	9566	7.5	10000
9352	9566	8.0	6000
9352	9566	8.5	5000
9352	9566	9.0	6000
9352	9566	9.5	7000
9352	9566	10.0	8000
9352	9566	10.5	10000
9352	9566	11.0	10000
9352	9566	11.5	11000
9352	9566	12.0	11000
9352	9566	12.5	11000
9352	9566	13.0	11000
9352	9566	13.5	11000
9352	9566	14.0	11000

Borehole B3890C009

9370	9815	0.5	13000
9370	9815	1.0	22000
9370	9815	1.5	22000
9370	9815	2.0	23000
9370	9815	2.5	20000
9370	9815	3.0	16000
9370	9815	3.5	15000
9370	9815	4.0	15000
9370	9815	4.5	16000
9370	9815	5.0	16000
9370	9815	5.5	14000
9370	9815	6.0	14000
9370	9815	6.5	14000
9370	9815	7.0	15000
9370	9815	7.5	18000
9370	9815	8.0	21000

Table D-25
(continued)

Page 4 of 36

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890C009 (continued)</u>			
9370	9815	8.5	21000
9370	9815	9.0	26000
9370	9815	9.5	19000
9370	9815	10.0	17000
9370	9815	10.5	17000
9370	9815	11.0	15000
9370	9815	11.5	11000
9370	9815	12.0	11000
9370	9815	12.5	11000
9370	9815	13.0	11000
9370	9815	13.5	11000
9370	9815	14.0	11000
9370	9815	14.5	12000
9370	9815	15.0	11000
9370	9815	15.5	11000
9370	9815	16.0	15000
<u>Borehole B3890C012^d</u>			
9419	9576	0.5	43000
9419	9576	1.0	29000
9419	9576	1.5	23000
9419	9576	2.0	16000
9419	9576	2.5	8000
9419	9576	3.0	7000
9419	9576	3.5	7000
9419	9576	4.0	7000
9419	9576	4.5	7000
9419	9576	5.0	7000
9419	9576	5.5	9000
9419	9576	6.0	9000
9419	9576	6.5	12000
9419	9576	7.0	13000
9419	9576	7.5	19000
9419	9576	8.0	23000
9419	9576	8.5	35000
9419	9576	9.0	75000
9419	9576	9.5	143000
9419	9576	10.0	154000
9419	9576	10.5	155000
9419	9576	11.0	171000

Table D-25
(continued)

Page 5 of 36

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890C012^d (continued)

9419	9576	11.5	282000
9419	9576	12.0	425000
9419	9576	12.5	294000
9419	9576	13.0	149000
9419	9576	13.5	69000
9419	9576	14.0	42000
9419	9576	14.5	26000
9419	9576	15.0	23000
9419	9576	15.5	18000
9419	9576	16.0	23000
9419	9576	16.5	20000

Borehole B3890C012-1

9420	9574	0.5	34000
9420	9574	1.0	35000
9420	9574	1.5	52000
9420	9574	2.0	27000
9420	9574	2.5	9000
9420	9574	3.0	7000
9420	9574	3.5	8000
9420	9574	4.0	11000
9420	9574	4.5	14000
9420	9574	5.0	39000
9420	9574	5.5	94000
9420	9574	6.0	168000
9420	9574	6.5	170000
9420	9574	7.0	198000
9420	9574	7.5	172000
9420	9574	8.0	144000
9420	9574	8.5	164000
9420	9574	9.0	256000
9420	9574	9.5	328000
9420	9574	10.0	271000
9420	9574	10.5	135000
9420	9574	11.5	67000
9420	9574	12.0	38000
9420	9574	12.5	23000
9420	9574	13.0	17000
9420	9574	13.5	14000
9420	9574	14.0	13000
9420	9574	14.5	12000
9420	9574	15.0	12000

Table D-25
(continued)

Page 6 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890C012-1 (continued)</u>			
9420	9574	15.5	13000
9420	9574	16.0	20000
9420	9574	16.5	13000
9420	9574	17.0	18000
9420	9574	17.5	20000
<u>Borehole B3890C014^d</u>			
9451	9402	0.5	30000
9451	9402	1.0	20000
9451	9402	1.5	18000
9451	9402	2.0	31000
9451	9402	2.5	32000
9451	9402	3.0	43000
9451	9402	3.5	67000
9451	9402	4.0	136000
9451	9402	4.5	271000
9451	9402	5.0	464000
9451	9402	5.5	539000
9451	9402	6.0	546000
9451	9402	6.5	472000
9451	9402	7.0	390000
9451	9402	7.5	233000
9451	9402	8.0	153000
9451	9402	8.5	99000
9451	9402	9.0	32000
9451	9402	9.5	18000
9451	9402	10.0	13000
9451	9402	10.5	11000
9451	9402	11.0	11000
9451	9402	11.5	11000
9451	9402	12.0	11000
9451	9402	12.5	9000
9451	9402	13.0	9000
9451	9402	13.5	9000
9451	9402	14.0	9000
9451	9402	14.5	9000
9451	9402	15.0	9000
9451	9402	15.5	10000
9451	9402	16.0	19000
9451	9402	16.5	25000
9451	9402	17.0	19000
9451	9402	17.5	19000

Table D-25
(continued)

Page 7 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890C025^d</u>			
9500	9650	0.5	11000
9500	9650	1.0	9000
9500	9650	1.5	7000
9500	9650	2.0	5000
9500	9650	2.5	5000
9500	9650	3.0	5000
9500	9650	3.5	5000
9500	9650	4.0	6000
9500	9650	4.5	6000
9500	9650	5.0	7000
9500	9650	5.5	11000
9500	9650	6.0	22000
9500	9650	6.5	55000
9500	9650	7.0	71000
9500	9650	7.5	63000
9500	9650	8.0	49000
9500	9650	8.5	35000
9500	9650	9.0	22000
9500	9650	9.5	14000
9500	9650	10.0	10000
9500	9650	10.5	10000
9500	9650	11.0	10000
9500	9650	11.5	10000
9500	9650	12.0	10000
9500	9650	12.5	9000
9500	9650	13.0	8000
9500	9650	13.5	8000
<u>Borehole B3890C029^d</u>			
9510	9800	0.5	12000
9510	9800	1.0	16000
9510	9800	1.5	18000
9510	9800	2.0	18000
9510	9800	2.5	17000
9510	9800	3.0	12000
9510	9800	3.5	7000
9510	9800	4.0	4000
9510	9800	4.5	3000
9510	9800	5.0	3000
9510	9800	5.5	3000
9510	9800	6.0	3000

Table D-25
(continued)

Page 8 of 36

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890C029^d (continued)

9510	9800	6.5	3000
9510	9800	7.0	6000
9510	9800	7.5	13000
9510	9800	8.0	21000
9510	9800	8.5	14000
9510	9800	9.0	5000
9510	9800	9.5	3000
9510	9800	10.0	2000
9510	9800	10.5	1000
9510	9800	11.0	1000
9510	9800	11.5	2000
9510	9800	12.0	2000
9510	9800	12.5	3000
9510	9800	13.0	5000
9510	9800	13.5	5000
9510	9800	14.0	5000
9510	9800	14.5	5000
9510	9800	15.0	4000
9510	9800	15.5	4000
9510	9800	16.0	4000
9510	9800	16.5	4000
9510	9800	17.0	3000
9510	9800	17.5	3000

Borehole B3890C-11

9552	9559	0.5	32000
9552	9559	1.0	38000
9552	9559	1.5	51000
9552	9559	2.0	77000
9552	9559	2.5	64000
9552	9559	3.0	30000
9552	9559	3.5	18000
9552	9559	4.0	17000
9552	9559	4.5	16000
9552	9559	5.0	15000
9552	9559	5.5	12000
9552	9559	6.0	13000
9552	9559	6.5	14000
9552	9559	7.0	11000
9552	9559	7.5	9000
9552	9559	8.0	9000

Table D-25
(continued)

Page 9 of 36

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890C-11 (continued)

9552	9559	8.5	13000
9552	9559	9.0	13000
9552	9559	9.5	9000
9552	9559	10.0	9000
9552	9559	10.5	9000
9552	9559	11.0	8000
9552	9559	11.5	8000
9552	9559	12.0	8000
9552	9559	12.5	7000
9552	9559	13.0	7000
9552	9559	13.5	7000
9552	9559	14.0	6000
9552	9559	14.5	6000
9552	9559	15.0	6000
9552	9559	15.5	6000
9552	9559	16.0	6000
9552	9559	16.5	6000
9552	9559	17.0	6000
9552	9559	17.5	6000
9552	9559	18.0	7000
9552	9559	18.5	8000
9552	9559	19.0	10000
9552	9559	19.5	10000
9552	9559	20.0	10000

Borehole B3890C006

9565	9685	0.5	23000
9565	9685	1.0	27000
9565	9685	1.5	22000
9565	9685	2.0	20000
9565	9685	2.5	15000
9565	9685	3.0	16000
9565	9685	3.5	20000
9565	9685	4.0	30000
9565	9685	4.5	16000
9565	9685	5.0	22000
9565	9685	5.5	18000
9565	9685	6.0	15000
9565	9685	6.5	8000
9565	9685	7.0	4000
9565	9685	7.5	3000

Table D-25
(continued)

Page 10 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890C006 (continued)

9565	9685	8.0	2000
9565	9685	8.5	2000
9565	9685	9.0	2000
9565	9685	9.5	3000
9565	9685	10.0	6000
9565	9685	10.5	6000
9565	9685	11.0	6000
9565	9685	11.5	5000
9565	9685	12.0	5000
9565	9685	12.5	5000
9565	9685	13.0	5000
9565	9685	13.5	5000
9565	9685	14.0	5000
9565	9685	14.5	5000
9565	9685	15.0	5000
9565	9685	15.5	5000
9565	9685	16.0	5000
9565	9685	16.5	5000
9565	9685	17.0	5000
9565	9685	17.5	5000
9565	9685	18.0	8000

Borehole B3890C006-1

9566	9685	0.5	26000
9566	9685	1.0	29000
9566	9685	1.5	29000
9566	9685	2.0	24000
9566	9685	2.5	20000
9566	9685	3.0	20000
9566	9685	3.5	30000
9566	9685	4.0	43000
9566	9685	4.5	31000
9566	9685	5.0	27000
9566	9685	5.5	25000
9566	9685	6.0	23000

Borehole B3890C006-2

9566	9688	0.5	22000
9566	9688	1.0	25000
9566	9688	1.5	24000
9566	9688	2.0	22000

Table D-25
(continued)

Page 11 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890C006-2 (continued)</u>			
9566	9688	2.5	17000
9566	9688	3.0	17000
9566	9688	3.5	28000
9566	9688	4.0	32000
9566	9688	4.5	22000
9566	9688	5.0	23000
9566	9688	5.5	18000
9566	9688	6.0	12000
9566	9688	6.5	6000
9566	9688	7.0	5000
9566	9688	7.5	4000
9566	9688	8.0	4000
<u>Borehole B3890C024</u>			
9600	9900	0.5	9000
9600	9900	1.0	6000
9600	9900	1.5	5000
9600	9900	2.0	4000
9600	9900	2.5	4000
9600	9900	3.0	5000
9600	9900	3.5	6000
9600	9900	4.0	4000
9600	9900	4.5	4000
9600	9900	5.0	4000
9600	9900	5.5	4000
9600	9900	6.0	4000
9600	9900	6.5	4000
9600	9900	7.0	4000
9600	9900	7.5	6000
9600	9900	8.0	8000
9600	9900	8.5	10000
9600	9900	9.0	11000
9600	9900	9.5	12000
9600	9900	10.0	12000
9600	9900	10.5	13000
9600	9900	11.0	12000
9600	9900	11.5	12000
9600	9900	12.0	12000
9600	9900	12.5	13000
9600	9900	13.0	13000
9600	9900	13.5	14000
9600	9900	14.0	13000

Table D-25
(continued)

Page 12 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890C016</u>			
9602	9249	0.5	138000
9602	9249	1.0	140000
9602	9249	1.5	107000
9602	9249	2.0	77000
9602	9249	2.5	38000
9602	9249	3.0	26000
9602	9249	3.5	20000
9602	9249	4.0	20000
9602	9249	4.5	29000
9602	9249	5.0	38000
9602	9249	5.5	38000
9602	9249	6.0	58000
9602	9249	6.5	127000
9602	9249	7.0	230000
9602	9249	7.5	310000
9602	9249	8.0	325000
9602	9249	8.5	444000
9602	9249	9.0	351000
9602	9249	9.5	309000
9602	9249	10.0	355000
9602	9249	10.5	472000
9602	9249	11.0	539000
9602	9249	11.5	436000
9602	9249	12.0	184000
9602	9249	12.5	62000
9602	9249	13.0	33000
9602	9249	13.5	19000
9602	9249	14.0	9000
9602	9249	14.5	8000
9602	9249	15.0	8000
9602	9249	15.5	9000
9602	9249	16.0	8000
9602	9249	16.5	7000
9602	9249	17.0	7000
9602	9249	17.5	8000
9602	9249	18.0	8000
9602	9249	18.5	9000
9602	9249	19.0	10000
9602	9249	19.5	10000
9602	9249	20.0	7000

Table D-25
(continued)

Page 13 of 36

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C024-2^d</u>			
9605	9900	0.5	6000
9605	9900	1.0	5000
9605	9900	1.5	4000
9605	9900	2.0	5000
9605	9900	2.5	6000
9605	9900	3.0	8000
9605	9900	3.5	7000
9605	9900	4.0	6000
9605	9900	4.5	4000
9605	9900	5.0	4000
9605	9900	5.5	4000
9605	9900	6.0	4000
9605	9900	6.5	3000
9605	9900	7.0	4000
9605	9900	7.5	7000
9605	9900	8.0	8000
9605	9900	8.5	9000
9605	9900	9.0	9000
9605	9900	9.5	10000
9605	9900	10.0	10000
9605	9900	10.5	11000
9605	9900	11.0	11000
9605	9900	11.5	12000
9605	9900	12.0	12000
9605	9900	12.5	11000
9605	9900	13.0	10000

Borehole B3890C019

9665	9119	0.5	154000
9665	9119	1.0	330000
9665	9119	1.5	523000
9665	9119	2.0	799000
9665	9119	2.5	829000
9665	9119	3.0	738000
9665	9119	3.5	475000
9665	9119	4.0	306000
9665	9119	4.5	181000
9665	9119	5.0	65000
9665	9119	5.5	37000
9665	9119	6.0	28000
9665	9119	6.5	25000

Table D-25
(continued)

Page 14 of 36

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890C019 (continued)

9665	9119	7.0	16000
9665	9119	7.5	7000
9665	9119	8.0	7000
9665	9119	8.5	9000
9665	9119	9.0	20000
9665	9119	9.5	40000
9665	9119	10.0	25000
9665	9119	10.5	17000
9665	9119	11.0	10000
9665	9119	11.5	7000
9665	9119	12.0	6000
9665	9119	12.5	6000
9665	9119	13.0	6000
9665	9119	13.5	6000

Borehole B3890C015

9669	9423	0.5	12000
9669	9423	1.0	9000
9669	9423	1.5	11000
9669	9423	2.0	11000
9669	9423	2.5	21000
9669	9423	3.0	24000
9669	9423	3.5	26000
9669	9423	4.0	25000
9669	9423	4.5	23000
9669	9423	5.0	27000
9669	9423	5.5	39000
9669	9423	6.0	64000
9669	9423	6.5	106000
9669	9423	7.0	94000
9669	9423	7.5	87000
9669	9423	8.0	81000
9669	9423	8.5	34000
9669	9423	9.0	35000
9669	9423	9.5	21000
9669	9423	10.0	13000
9669	9423	10.5	10000
9669	9423	11.0	9000
9669	9423	11.5	9000
9669	9423	12.0	8000
9669	9423	12.5	8000

Table D-25
(continued)

Page 15 of 36

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890C015 (continued)

9669	9423	13.0	8000
9669	9423	13.5	8000
9669	9423	14.0	8000
9669	9423	14.5	8000
9669	9423	15.0	8000
9669	9423	15.5	8000
9669	9423	16.0	7000
9669	9423	16.5	7000
9669	9423	17.0	7000
9669	9423	17.5	6000
9669	9423	18.0	7000
9669	9423	18.5	6000

Borehole B3890C030

9685	9915	0.5	34000
9685	9915	1.0	55000
9685	9915	1.5	75000
9685	9915	2.0	130000
9685	9915	2.5	101000
9685	9915	3.0	104000
9685	9915	3.5	110000
9685	9915	4.0	137000
9685	9915	4.5	193000
9685	9915	5.0	188000
9685	9915	5.5	141000
9685	9915	6.0	96000
9685	9915	6.5	30000
9685	9915	7.0	21000
9685	9915	7.5	14000
9685	9915	8.0	11000
9685	9915	8.5	11000
9685	9915	9.0	10000
9685	9915	9.5	10000
9685	9915	10.0	11000
9685	9915	10.5	11000
9685	9915	11.0	11000
9685	9915	11.5	11000
9685	9915	12.0	12000
9685	9915	12.5	14000
9685	9915	13.0	13000
9685	9915	13.5	17000

Table D-25
(continued)

Page 16 of 36

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C030-2^d</u>			
9685	9919	0.5	54000
9685	9919	1.0	80000
9685	9919	1.5	119000
9685	9919	2.0	111000
9685	9919	2.5	96000
9685	9919	3.0	84000
9685	9919	3.5	54000
9685	9919	4.0	55000
9685	9919	4.5	46000
9685	9919	5.0	24000
9685	9919	5.5	13000
9685	9919	6.0	9000
9685	9919	6.5	7000
9685	9919	7.0	8000
9685	9919	7.5	8000
9685	9919	8.0	9000
9685	9919	8.5	9000
9685	9919	9.0	10000
9685	9919	9.5	9000
9685	9919	10.0	10000
9685	9919	10.5	10000
9685	9919	11.0	11000
9685	9919	11.5	11000
9685	9919	12.0	12000
9685	9919	12.5	12000
9685	9919	13.0	15000

Borehole B3890C026

9700	9300	0.5	11000
9700	9300	1.0	7000
9700	9300	1.5	3000
9700	9300	2.0	2000
9700	9300	2.5	2000
9700	9300	3.0	2000
9700	9300	3.5	2000
9700	9300	4.0	2000
9700	9300	4.5	2000
9700	9300	5.0	2000
9700	9300	5.5	2000
9700	9300	6.0	2000
9700	9300	6.5	2000

Table D-25
(continued)

Page 17 of 36

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C026 (continued)</u>			
9700	9300	7.0	3000
9700	9300	7.5	3000
9700	9300	8.0	8000
9700	9300	8.5	18000
9700	9300	9.0	13000
9700	9300	9.5	8000
9700	9300	10.0	7000
9700	9300	10.5	6000
9700	9300	11.0	6000
9700	9300	11.5	6000
9700	9300	12.0	6000
9700	9300	12.5	5000
9700	9300	13.0	5000
9700	9300	13.5	5000
9700	9300	14.5	6000
9700	9300	15.0	6000
9700	9300	15.5	7000
9700	9300	16.0	9000
9700	9300	16.5	9000
9700	9300	17.0	9000
9700	9300	17.5	9000
9700	9300	18.0	10000
9700	9300	18.5	10000
9700	9300	19.0	10000
9700	9300	19.5	11000
9700	9300	20.0	10000

Borehole B3890C0010^d

9727	9603	0.5	19000
9727	9603	1.0	20000
9727	9603	1.5	24000
9727	9603	2.0	26000
9727	9603	2.5	27000
9727	9603	3.0	25000
9727	9603	3.5	19000
9727	9603	4.0	14000
9727	9603	4.5	12000
9727	9603	5.0	12000
9727	9603	5.5	12000
9727	9603	6.0	12000
9727	9603	6.5	12000

Table D-25
(continued)

Page 18 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C0010^d</u> (continued)			
9727	9603	7.0	11000
9727	9603	7.5	12000
9727	9603	8.0	12000
9727	9603	8.5	12000
9727	9603	9.0	14000
<u>Borehole B3890C027</u>			
9734	9493	0.5	18000
9734	9493	1.0	17000
9734	9493	1.5	23000
9734	9493	2.0	28000
9734	9493	2.5	22000
9734	9493	3.0	21000
9734	9493	3.5	20000
9734	9493	4.0	13000
9734	9493	4.5	9000
9734	9493	5.0	8000
9734	9493	5.5	8000
9734	9493	6.0	8000
9734	9493	6.5	7000
9734	9493	7.0	7000
9734	9493	7.5	8000
9734	9493	8.0	7000
9734	9493	8.5	7000
9734	9493	9.0	7000
9734	9493	9.5	10000
9734	9493	10.0	10000
<u>Borehole B3890C010-1</u>			
9735	9603	0.5	16000
9735	9603	1.0	20000
9735	9603	1.5	24000
9735	9603	2.0	29000
9735	9603	2.5	29000
9735	9603	3.0	26000
9735	9603	3.5	22000
9735	9603	4.0	17000
9735	9603	4.5	12000
9735	9603	5.0	12000
9735	9603	5.5	12000

Table D-25
(continued)

Page 19 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890C033</u>			
9735	9700	0.5	14000
9735	9700	1.0	8000
9735	9700	1.5	10000
9735	9700	2.0	13000
9735	9700	2.5	20000
9735	9700	3.0	17000
9735	9700	3.5	10000
9735	9700	4.0	10000
9735	9700	4.5	13000
9735	9700	5.0	14000
9735	9700	5.5	13000
9735	9700	6.0	14000
9735	9700	6.5	15000
9735	9700	7.0	13000
<u>Borehole B3890C017</u>			
9752	9301	0.5	26000
9752	9301	1.0	40000
9752	9301	1.5	38000
9752	9301	2.0	26000
9752	9301	2.5	16000
9752	9301	3.0	14000
9752	9301	3.5	12000
9752	9301	4.0	11000
9752	9301	4.5	11000
9752	9301	5.0	10000
9752	9301	5.5	10000
9752	9301	6.0	9000
9752	9301	6.5	8000
9752	9301	7.0	8000
9752	9301	7.5	6000
9752	9301	8.0	6000
9752	9301	8.5	5000
9752	9301	9.0	5000
9752	9301	9.5	6000
9752	9301	10.0	6000
9752	9301	10.5	7000
9752	9301	11.0	7000
9752	9301	11.5	8000
9752	9301	12.0	9000
9752	9301	12.5	9000

Table D-25
(continued)

Page 20 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C017 (continued)</u>			
9752	9301	13.0	9000
9752	9301	13.5	9000
9752	9301	14.0	9000
9752	9301	14.5	9000
9752	9301	15.0	8000
9752	9301	15.5	8000
9752	9301	16.0	6000
<u>Borehole B3890C005^d</u>			
9798	9953	0.5	17000
9798	9953	1.0	11000
9798	9953	1.5	13000
9798	9953	2.0	13000
9798	9953	2.5	14000
9798	9953	3.0	16000
9798	9953	3.5	19000
9798	9953	4.0	26000
9798	9953	4.5	49000
9798	9953	5.0	77000
9798	9953	5.5	56000
9798	9953	6.0	29000
9798	9953	6.5	14000
9798	9953	7.0	11000
9798	9953	7.5	9000
9798	9953	8.0	10000
9798	9953	8.5	10000
9798	9953	9.0	11000
9798	9953	9.5	11000
9798	9953	10.0	12000
9798	9953	10.5	12000
9798	9953	11.0	13000
9798	9953	11.5	14000
9798	9953	12.0	14000
9798	9953	12.5	16000
9798	9953	13.0	17000
9798	9953	13.5	18000
9798	9953	14.0	18000
9798	9953	14.5	17000
9798	9953	15.0	17000
9798	9953	15.5	15000
9798	9953	16.0	15000
9798	9953	16.5	17000

Table D-25
(continued)

Page 21 of 36

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C032^d</u>			
9800	9735	0.5	11000
9800	9735	1.0	10000
9800	9735	1.5	14000
9800	9735	2.0	27000
9800	9735	2.5	41000
9800	9735	3.0	55000
9800	9735	3.5	29000
9800	9735	4.0	15000
9800	9735	4.5	11000
9800	9735	5.0	10000
9800	9735	5.5	10000
9800	9735	6.0	9000
9800	9735	6.5	9000
9800	9735	7.0	10000
9800	9735	7.5	10000
9800	9735	8.0	11000
9800	9735	8.5	12000
9800	9735	9.0	12000
9800	9735	9.5	12000
9800	9735	10.0	11000
9800	9735	10.5	10000
9800	9735	11.0	11000
9800	9735	11.5	10000
<u>Borehole B3890C020^d</u>			
9820	9042	0.5	68000
9820	9042	1.0	83000
9820	9042	1.5	168000
9820	9042	2.0	471000
9820	9042	2.5	738000
9820	9042	3.0	761000
9820	9042	3.5	667000
9820	9042	4.0	514000
9820	9042	4.5	304000
9820	9042	5.0	154000
9820	9042	5.5	80000
9820	9042	6.0	37000
9820	9042	6.5	23000
9820	9042	7.0	18000
9820	9042	7.5	12000
9820	9042	8.0	10000

Table D-25
(continued)

Page 22 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890C020^d (continued)</u>			
9820	9042	8.5	10000
9820	9042	9.0	15000
9820	9042	9.5	12000
9820	9042	10.0	13000
9820	9042	10.5	11000
9820	9042	11.0	11000
9820	9042	11.5	9000
9820	9042	12.0	6000
9820	9042	12.5	5000
9820	9042	13.0	5000
9820	9042	13.5	5000
9820	9042	14.0	5000
9820	9042	14.5	4000
<u>Borehole B3890C028-1</u>			
9820	9353	0.5	15000
9820	9353	1.0	15000
9820	9353	1.5	16000
9820	9353	2.0	16000
9820	9353	2.5	28000
9820	9353	3.0	27000
9820	9353	3.5	19000
9820	9353	4.0	17000
9820	9353	4.5	15000
9820	9353	5.0	16000
9820	9353	5.5	16000
9820	9353	6.0	16000
9820	9353	6.5	16000
9820	9353	7.0	16000
9820	9353	7.5	15000
9820	9353	8.0	15000
9820	9353	8.5	15000
9820	9353	9.0	14000
9820	9353	9.5	14000
9820	9353	10.0	15000
9820	9353	10.5	15000
9820	9353	11.0	14000
9820	9353	11.5	13000

Table D-25
(continued)

Page 23 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C028^d</u>			
9820	9355	0.5	37000
9820	9355	1.0	30000
9820	9355	1.5	21000
9820	9355	2.0	16000
9820	9355	2.5	15000
9820	9355	3.0	14000
9820	9355	3.5	14000
9820	9355	4.0	14000
9820	9355	4.5	15000
9820	9355	5.0	15000
9820	9355	5.5	15000
9820	9355	6.0	16000
9820	9355	6.5	17000
9820	9355	7.0	17000
9820	9355	7.5	17000
9820	9355	8.0	19000
9820	9355	8.5	20000
9820	9355	9.0	19000
9820	9355	9.5	17000
9820	9355	10.0	19000
9820	9355	10.5	20000
9820	9355	11.0	19000
9820	9355	11.5	18000
<u>Borehole B3890C030-2</u>			
9865	9919	0.5	54000
9865	9919	1.0	80000
9865	9919	1.5	119000
9865	9919	2.0	111000
9865	9919	2.5	96000
9865	9919	3.0	84000
9865	9919	3.5	54000
9865	9919	4.0	55000
9865	9919	4.5	46000
9865	9919	5.0	24000
9865	9919	5.5	13000
9865	9919	6.0	9000
9865	9919	6.5	7000
9865	9919	7.0	8000
9865	9919	7.5	8000
9865	9919	8.0	8000

Table D-25
(continued)

Page 24 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890C030-2 (continued)</u>			
9865	9919	8.5	9000
9865	9919	9.0	10000
9865	9919	9.5	9000
9865	9919	10.0	10000
9865	9919	10.5	10000
9865	9919	11.0	11000
9865	9919	11.5	11000
9865	9919	12.0	12000
9865	9919	12.5	12000
9865	9919	13.0	15000
<u>Borehole B3890C021</u>			
9870	9815	0.5	78000
9870	9815	1.0	127000
9870	9815	1.5	119000
9870	9815	2.0	76000
9870	9815	2.5	41000
9870	9815	3.0	41000
9870	9815	3.5	41000
9870	9815	4.0	130000
9870	9815	4.5	260000
9870	9815	5.0	353000
9870	9815	5.5	272000
9870	9815	6.0	119000
9870	9815	6.5	41000
9870	9815	7.0	19000
9870	9815	7.5	13000
9870	9815	8.0	13000
9870	9815	8.5	13000
9870	9815	9.0	12000
9870	9815	9.5	10000
9870	9815	10.0	10000
9870	9815	10.5	10000
9870	9815	11.0	12000
9870	9815	11.5	12000
9870	9815	12.0	13000
9870	9815	12.5	14000
9870	9815	13.0	15000
9870	9815	13.5	16000
9870	9815	14.0	17000

Table D-25
(continued)

Page 25 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C031</u>			
9875	9885	0.5	19000
9875	9885	1.0	20000
9875	9885	1.5	17000
9875	9885	2.0	19000
9875	9885	2.5	22000
9875	9885	3.0	29000
9875	9885	3.5	55000
9875	9885	4.0	144000
9875	9885	4.5	252000
9875	9885	5.0	266000
9875	9885	5.5	283000
9875	9885	6.0	187000
9875	9885	6.5	89000
9875	9885	7.0	34000
9875	9885	7.5	11000
9875	9885	8.0	8000
9875	9885	8.5	6000
9875	9885	9.0	5000
9875	9885	9.5	7000
9875	9885	10.0	9000
9875	9885	10.5	10000
9875	9885	11.0	10000
9875	9885	11.5	10000
9875	9885	12.0	10000
9875	9885	12.5	10000
9875	9885	13.0	10000
9875	9885	13.5	10000
9875	9885	14.0	9000
9875	9885	14.5	8000
9875	9885	15.0	8000
9875	9885	15.5	7000
9875	9885	16.0	8000
9875	9885	16.5	9000
9875	9885	17.0	10000
9875	9885	17.5	11000
9875	9885	18.0	12000
9875	9885	18.5	13000
9875	9885	19.0	13000
9875	9885	19.5	13000
9875	9885	20.0	12000

Table D-25
(continued)

Page 26 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C018</u>			
9933	9153	0.5	24000
9933	9153	1.0	27000
9933	9153	1.5	20000
9933	9153	2.0	14000
9933	9153	2.5	13000
9933	9153	3.0	13000
9933	9153	3.5	13000
9933	9153	4.0	14000
9933	9153	4.5	14000
9933	9153	5.0	15000
9933	9153	5.5	14000
9933	9153	6.0	14000
9933	9153	6.5	13000
9933	9153	7.0	12000
9933	9153	7.5	11000
9933	9153	8.0	8000
<u>Borehole B3890C007</u>			
9951	9903	0.5	17000
9951	9903	1.0	16000
9951	9903	1.5	18000
9951	9903	2.0	21000
9951	9903	2.5	22000
9951	9903	3.0	24000
9951	9903	3.5	27000
9951	9903	4.0	30000
9951	9903	4.5	37000
9951	9903	5.0	23000
9951	9903	5.5	12000
9951	9903	6.0	8000
9951	9903	6.5	7000
9951	9903	7.0	6000
9951	9903	7.5	6000
9951	9903	8.0	5000
9951	9903	8.5	5000
9951	9903	9.0	5000
9951	9903	9.5	6000
9951	9903	10.0	6000
9951	9903	10.5	7000
9951	9903	11.0	14000
9951	9903	11.5	16000

Table D-25
(continued)

Page 27 of 36

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890C007 (continued)</u>			
9951	9903	12.0	12000
9951	9903	12.5	10000
9951	9903	13.0	9000
9951	9903	13.5	10000
9951	9903	14.0	9000
9951	9903	14.5	8000
9951	9903	15.0	8000
9951	9903	15.5	11000
9951	9903	16.0	11000
9951	9903	16.5	12000
9951	9903	17.0	11000
9951	9903	17.5	10000
9951	9903	18.0	8000
9951	9903	18.5	7000
9951	9903	19.0	7000
9951	9903	19.5	7000
9951	9903	20.0	7000
9951	9903	20.5	8000
9951	9903	21.0	9000
9951	9903	21.5	11000
9951	9903	22.0	13000
9951	9903	22.5	12000
9951	9903	23.0	12000
9951	9903	23.5	13000
9951	9903	24.0	13000

Borehole B3890C004^d

10022	9928	0.5	58000
10022	9928	1.0	59000
10022	9928	1.5	61000
10022	9928	2.0	67000
10022	9928	2.5	75000
10022	9928	3.0	90000
10022	9928	3.5	109000
10022	9928	4.0	124000
10022	9928	4.5	192000
10022	9928	5.0	295000
10022	9928	5.5	247000
10022	9928	6.0	181000
10022	9928	6.5	190000
10022	9928	7.0	248000

Table D-25
(continued)

Page 28 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890C004^d (continued)</u>			
10022	9928	7.5	318000
10022	9928	8.0	285000
10022	9928	8.5	217000
10022	9928	9.0	184000
10022	9928	9.5	186000
10022	9928	10.0	181000
10022	9928	10.5	154000
10022	9928	11.0	135000
10022	9928	11.5	123000
10022	9928	12.0	112000
10022	9928	12.5	108000
10022	9928	13.0	107000
10022	9928	13.5	106000
10022	9928	14.0	106000
10022	9928	14.5	100000
10022	9928	15.0	97000
<u>Borehole B3890C004-1</u>			
10022	9928	0.5	87000
10022	9928	1.0	85000
10022	9928	1.5	93000
10022	9928	2.0	109000
10022	9928	2.5	107000
10022	9928	3.0	140000
10022	9928	3.5	168000
10022	9928	4.0	242000
10022	9928	4.5	356000
10022	9928	5.0	303000
10022	9928	5.5	248000
10022	9928	6.0	259000
10022	9928	6.5	316000
10022	9928	7.0	408000
10022	9928	7.5	337000
10022	9928	8.0	251000
10022	9928	8.5	185000
10022	9928	9.0	188000
10022	9928	9.5	200000
10022	9928	10.0	187000
10022	9928	10.5	156000
10022	9928	11.0	134000
10022	9928	11.5	127000

Table D-25
(continued)

Page 29 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890C004-1 (continued)

10022	9928	12.0	118000
10022	9928	12.5	114000
10022	9928	13.0	112000
10022	9928	13.5	114000
10022	9928	14.0	101000
10022	9928	14.5	89000
10022	9928	15.0	78000
10022	9928	15.5	69000
10022	9928	16.0	60000
10022	9928	16.5	60000
10022	9928	17.0	54000
10022	9928	17.5	54000
10022	9928	18.0	51000
10022	9928	18.5	45000
10022	9928	19.0	44000
10022	9928	19.5	43000
10022	9928	20.0	44000
10022	9928	20.5	37000
10022	9928	21.0	34000
10022	9928	21.5	33000
10022	9928	22.0	32000

Borehole B3890C023

10025	10004	0.5	44000
10025	10004	1.0	67000
10025	10004	1.5	106000
10025	10004	2.0	172000
10025	10004	2.5	264000
10025	10004	3.0	331000
10025	10004	3.5	251000
10025	10004	4.0	132000
10025	10004	4.5	89000
10025	10004	5.0	78000
10025	10004	5.5	79000
10025	10004	6.0	99000
10025	10004	6.5	60000
10025	10004	7.0	30000
10025	10004	7.5	18000
10025	10004	8.0	15000
10025	10004	8.5	13000
10025	10004	9.0	12000

Table D-25
(continued)

Page 30 of 36

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890C023 (continued)

10025	10004	9.5	12000
10025	10004	10.0	12000
10025	10004	10.5	12000
10025	10004	11.0	12000
10025	10004	11.5	12000
10025	10004	12.0	12000
10025	10004	12.5	12000
10025	10004	13.0	12000
10025	10004	13.5	14000
10025	10004	14.0	14000
10025	10004	14.5	14000
10025	10004	15.0	14000

Borehole B3890C002^d

10128	9982	0.5	65000
10128	9982	1.0	96000
10128	9982	1.5	175000
10128	9982	2.0	265000
10128	9982	2.5	468000
10128	9982	3.0	557000
10128	9982	3.5	789000
10128	9982	4.0	751000
10128	9982	4.5	564000
10128	9982	5.0	549000
10128	9982	5.5	538000
10128	9982	6.0	546000
10128	9982	6.5	558000
10128	9982	7.0	561000
10128	9982	7.5	478000
10128	9982	8.0	319000
10128	9982	8.5	146000
10128	9982	9.0	65000
10128	9982	9.5	45000
10128	9982	10.0	58000
10128	9982	10.5	70000
10128	9982	11.0	74000
10128	9982	11.5	38000

Table D-25
(continued)

Page 31 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C022^d</u>			
10150	9950	0.5	294000
10150	9950	1.0	474000
10150	9950	1.5	526000
10150	9950	2.0	609000
10150	9950	2.5	770000
10150	9950	3.0	950000
10150	9950	3.5	712000
10150	9950	4.0	573000
10150	9950	4.5	603000
10150	9950	5.0	510000
10150	9950	5.5	401000
10150	9950	6.0	219000
10150	9950	6.5	103000
10150	9950	7.0	75000
10150	9950	7.5	100000
10150	9950	8.0	140000
10150	9950	8.5	170000
10150	9950	9.0	193000
10150	9950	9.5	179000
10150	9950	10.0	145000
10150	9950	10.5	37000
10150	9950	11.0	25000
10150	9950	11.5	18000
10150	9950	12.0	23000
10150	9950	12.5	25000
10150	9950	13.0	25000

Borehole B3890C022-3^d

10152	9946	0.5	359000
10152	9946	1.0	515000
10152	9946	1.5	619000
10152	9946	2.0	625000
10152	9946	2.5	636000
10152	9946	3.0	675000
10152	9946	3.5	723000
10152	9946	4.0	652000
10152	9946	4.5	685000
10152	9946	5.0	682000
10152	9946	5.5	646000
10152	9946	6.0	629000
10152	9946	6.5	517000

Table D-25
(continued)

Page 32 of 36

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890C022-3^d</u> (continued)			
10152	9946	7.0	358000
10152	9946	7.5	146000
10152	9946	8.0	89000
10152	9946	8.5	69000
10152	9946	9.0	52000
10152	9946	9.5	58000
10152	9946	10.0	69000
10152	9946	10.5	106000
10152	9946	11.0	97000
10152	9946	11.5	563000
10152	9946	12.0	55000
10152	9946	12.5	69000
10152	9946	13.0	167000
10152	9946	13.5	94000
10152	9946	14.0	79000
10152	9946	14.5	25000
10152	9946	15.0	29000

Borehole B3890C022-2^d

10154	9946	0.5	421000
10154	9946	1.0	541000
10154	9946	1.5	568000
10154	9946	2.0	960000
10154	9946	2.5	1159000
10154	9946	3.0	1170000
10154	9946	3.5	1158000
10154	9946	4.0	1118000
10154	9946	4.5	666000
10154	9946	5.0	509000
10154	9946	5.5	316000
10154	9946	6.0	234000
10154	9946	6.5	212000
10154	9946	7.0	208000
10154	9946	7.5	217000
10154	9946	8.0	244000
10154	9946	8.5	257000
10154	9946	9.0	307000
10154	9946	9.5	278000
10154	9946	10.0	270000
10154	9946	10.5	259000
10154	9946	11.0	261000

Table D-25
(continued)

Page 33 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890C022-2^d</u> (continued)			
10154	9946	11.5	253000
10154	9946	12.0	215000
10154	9946	12.5	180000
10154	9946	13.0	147000
<u>Borehole B3890C022-1^d</u>			
10154	9950	1.0	465000
10154	9950	2.0	875000
10154	9950	3.0	897000
10154	9950	4.0	939000
10154	9950	5.0	519000
10154	9950	6.0	267000
10154	9950	7.0	176000
10154	9950	8.0	201000
10154	9950	9.0	241000
10154	9950	10.0	145000
10154	9950	11.0	202000
<u>Borehole B3890C003-1</u>			
10224	9876	0.5	114000
10224	9876	1.0	194000
10224	9876	1.5	335000
10224	9876	2.0	262000
10224	9876	2.5	234000
10224	9876	3.0	254000
10224	9876	3.5	356000
10224	9876	4.0	513000
10224	9876	4.5	472000
10224	9876	5.0	284000
10224	9876	5.5	173000
10224	9876	6.0	178000
10224	9876	6.5	210000
10224	9876	7.0	247000
10224	9876	7.5	274000
10224	9876	8.0	264000
10224	9876	8.5	252000
10224	9876	9.0	250000
10224	9876	9.5	262000
10224	9876	10.0	257000

Table D-25
(continued)

Page 34 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890C003-1 (continued)</u>			
10224	9876	10.5	248000
10224	9876	11.0	288000
10224	9876	11.5	306000
<u>Borehole B3890C003-2^d</u>			
10226	9877	0.5	123000
10226	9877	1.0	128000
10226	9877	1.5	225000
10226	9877	2.0	241000
10226	9877	2.5	241000
10226	9877	3.0	283000
10226	9877	3.5	269000
10226	9877	4.0	423000
10226	9877	4.5	419000
10226	9877	5.0	314000
10226	9877	5.5	221000
10226	9877	6.0	200000
10226	9877	6.5	
10226	9877	7.0	
10226	9877	7.5	
10226	9877	8.0	
10226	9877	8.5	
10226	9877	9.0	
10226	9877	9.5	
10226	9877	10.0	
10226	9877	10.5	
10226	9877	11.0	
10226	9877	11.5	
10226	9877	12.0	78000
10226	9877	12.5	35000
10226	9877	13.0	27000
10226	9877	13.5	21000
10226	9877	14.0	20000
10226	9877	14.5	20000
10226	9877	15.0	23000
10226	9877	15.5	30000
10226	9877	16.0	26000
10226	9877	16.5	24000
10226	9877	17.0	23000
10226	9877	17.5	22000

Table D-25
(continued)

Page 35 of 36

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890C001^d</u>			
10246	9964	0.5	135000
10246	9964	1.0	214000
10246	9964	1.5	385000
10246	9964	2.0	526000
10246	9964	2.5	375000
10246	9964	3.0	262000
10246	9964	3.5	62000
10246	9964	4.0	89000
10246	9964	4.5	58000
10246	9964	5.0	57000
10246	9964	5.5	54000
10246	9964	6.0	50000
10246	9964	6.5	47000
10246	9964	7.0	47000
10246	9964	7.5	44000
10246	9964	8.0	39000
10246	9964	8.5	31000
10246	9964	9.0	27000
10246	9964	9.5	27000
10246	9964	10.0	30000

Borehole B3890C001-2

10250	9960	0.5	13000
10250	9960	1.0	16000
10250	9960	1.5	22000
10250	9960	2.0	49000
10250	9960	2.5	395000
10250	9960	3.0	478000
10250	9960	3.5	288000
10250	9960	4.0	128000
10250	9960	4.5	73000
10250	9960	5.0	69000
10250	9960	5.5	75000
10250	9960	6.0	66000
10250	9960	6.5	60000
10250	9960	7.0	28000
10250	9960	7.5	26000
10250	9960	8.0	24000
10250	9960	8.5	34000
10250	9960	9.0	33000
10250	9960	9.5	30000

Table D-25
(continued)

Page 36 of 36

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<hr/>			
<u>Borehole B3890C001-2 (continued)</u>			
10250	9960	10.0	24000
10250	9960	10.5	22000
10250	9960	11.0	23000
10250	9960	11.5	25000
10250	9960	12.0	24000
10250	9960	12.5	18000
10250	9960	13.0	17000

^aBorehole locations are shown in figures in Volume I, Section 4.2.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Geologic Logs

Storage Pile Geologic Logs

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	MOLE NO. CP1				
SITE Maywood Inter. Storage Pile			COORDINATES N 9875.0; E 9675.0			ANGLE FROM HORIZ. BEARING Vertical						
BEGUN 10-11-90	COMPLETED 10-11-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 6.1	ROCK (FT.) 0.0	TOTAL DEPTH 6.1				
CORE RECOVERY (FT./%) 4.2/69*		CORE BOXES 0	SAMPLES 2**	EL. TOP CASING NA	GROUND EL. 68.0	DEPTH/EL. GROUND WATER / NA / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel							
(Template: MYWD)												
SAMP. TYPE SAND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPL. IN. BL. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.6					68.0				0.0 - 5.6 ft: FILL. 0.0 - 3.1 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), slightly moist.	Complete borehole number is B3890C1
SS	2.0	1.1					66.5 66.0					Hole advanced by driving 3" OD split spoon samplers.
SS	2.1	1.6					64.9 64.0 62.4 61.9				4.0 - 5.6 ft: Sandy SILT, (ML); Blackish red (5R2/2).	Borehole sampled 1 TMA/Eberline Cor
TOTAL DEPTH = 6.1 FT.											Spoon refusal at 6.	
											Borehole backfilled with cuttings and sand upon completion.	
											* Core recovery ref to total soil & rock sample.	
											** Number of chemical samples to lab.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination sample.	
											Colors from "Rock-Color Chart (GSA, 1948).	

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE
D = DENNISON; P = PITCHER; O = OTHER

Maywood Inter. Storage Pile

Last Update: 06-10-91

MOLE NO. CP1

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP				
SITE Maywood Inter. Storage Pile			COORDINATES N 9868.0; E 9732.0				ANGLE FROM HORIZ Vertical		BEARING -----				
BEGUN 10-1-90	COMPLETED 10-1-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 6.0	ROCK (FT.) 0.0	TOTAL DI 6.0				
CORE RECOVERY (FT./%) 3.3/55*		CORE BOXES 0	SAMPLES 2**	EL. TOP CASING NA	GROUND EL. 79.0	DEPTH/EL. GROUND WATER / NA		DEPTH/EL. TOP OF ROCK NA/NA					
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel								
SAMP TYPE AND DIA.	SAMP ADV. LEN CORE	SAMP REC. CORE REC.	SAMP IN. BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN CHARACTER OF DRILLING, ET
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6						79.0				0.0 - 3.7 ft: FILL; Gravelly, Silty SAND, (SW); Dark reddish brown (10R3/4) changing to Blackish red (5R2/3) at 2.0', moist.	Complete borehole number is B3890C Hole advanced by driving 3" OD spl spoon samplers. Borehole sampled TMA/Eberline Co
SS	2.0	1.7					77.4 77.0						
SS	2.0	0.0					75.3						
							73.0						
											TOTAL DEPTH = 6.0 FT.	Spoon refusal at 6 Borehole backfills with cuttings and sand upon completion.	
													* Core recovery % to total soil & roc sample. ** Number of chemical samples to lab. Ground elevation estimated from sit topographic map. Description & classification by visual examinatic sample. Colors from "Rock-Color Cha (GSA, 1948).

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE Maywood Inter. Storage Pile Last Update: 06-10-91 HOLE NO. CP2
D = DENNISON; P = PITCHER; O = OTHER

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP2-							
SITE Maywood Inter. Storage Pile				COORDINATES N 9868.0; E 9728.0			ANGLE FROM HORIZ/BEARING Vertical -----									
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DE								
10-1-90	10-1-90	Hydro Group, Inc.	Tripod		3"	4.1	0.0	4.1								
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK								
0.0/0*		0	0**	NA	79.0	7 / NA 3 / NA		NA/NA								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:											
140 lbs/30 in		none			Stephen Knüttel											
SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. IN. BULBS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET			
											79.0				0.0 - 4.1 ft: See Hole CP2.	Complete borehole number is B3890CP2-1.
											74.9					Samples between - 4.0' were obtained from Hole CP2.
											TOTAL DEPTH = 4.1 FT.	Hole advanced by driving 3" OD spl spoon samplers.				
												Spoon refusal at 4 Borehole backfilled with cuttings and sand upon completion.				

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO
CP2-1

* Core recovery n to total soil & roc sample.

** Number of chemical samples to lab.

Ground elevation estimated from sit topographic map.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP2				
SITE Maywood Inter. Storage Pile			COORDINATES N 9868.0; E 9725.0				ANGLE FROM HORIZ Vertical		BEARING ----				
BEGUN 10-1-90	COMPLETED 10-1-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 10.5	ROCK (FT.) 0.0	TOTAL I 10.				
CORE RECOVERY (FT./%) 6.8/65°		CORE BOXES 0	SAMPLES 2**	EL. TOP CASING NA	GROUND EL. 79.0	DEPTH/EL. GROUND WATER 3 / NA		DEPTH/EL. TOP OF ROCK NA/NA					
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. N°	CORE RECOVERY	LOSS IN G.P.H.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E
						PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4						79.0				0.0 - 0.1 ft: FILL.	Complete borehole number is B3890CP2-2. Samples between - 4.0' were obtained from Hole CP2. Hole advanced by driving 3" OD spoon samplers. Borehole sample TMA/Eberline
								77.6				0.0 - 3.4 ft: Gravelly, Silty SAND, (SW); Dark reddish brown (10R3/4) changing to Blackish red (5R3/2) at 2.0', moist.	
SS	2.0	1.4						77.0					
								75.6					
SS	2.0	1.3						75.0				4.0 - 5.3 ft: Gravelly, Sandy SILT, (GM); Blackish red (10R3/4), moist.	
								73.7	5				
SS	2.0	1.6						73.0				6.0 - 9.1 ft: Sandy SILT, (SM); Grayish black (N2), moist	
								71.4					
								71.0					
SS	2.5	1.1						69.9					
								68.5	10				
												TOTAL DEPTH = 10.5 FT. Borehole complete at 10.5'. Borehole backfill with cuttings as sand upon completion.	
													* Core recovery to total soil & n sample. ** Number of chemical sample to lab. Ground elevatic estimated from topographic ma Description & classification by visual examinat sample. Colors from "Rock-Color C1 (GSA, 1948).

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO.

CP2-

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP3		
SITE Maywood Inter. Storage Pile				COORDINATES N 9885.0; E 9760.0				ANGLE FROM HORIZ. BEARING Vertical			
REGUN	COMPLETED	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 8.6	ROCK (FT.) 0.0	TOTAL DEP 8.6		
CORE RECOVERY (FT./%) 6.3/73*		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
		0	6**	NA	80.5	NA / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY: Stephen Knüttel						
		none									
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE "IN" CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: NYWD)	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.7					80.5			0.0 - 2.5 ft: FILL	Complete borehole number is B3890C
							78.8			0.0 - 1.7 ft: Silty, Sandy GRAVEL, (GW); Dark reddish brown (10R3/4), slightly moist, loose.	Hole advanced by driving 3" OD split spoon samplers.
SS	2.0	1.1					78.5			2.0 - 3.5 ft: Sandy SILT, (SW); Grayish black (N2), moist.	Borehole sampled TMA/Eberline Co
							77.4				
SS	2.0	1.4					76.5				
							75.1				
SS	2.0	1.6					74.5				
							72.9				
SS	0.6	0.5					72.5				Spoon refusal at 1
							72.0				
							71.9			TOTAL DEPTH = 8.6 FT.	Borehole backfill with cuttings and sand upon completion.
											* Core recovery 1 to total soil & re sample.
											** Number of chemical samples to lab.
											Ground elevation estimated from a topographic map
											Description & classification by visual examination of sample.
											Colors from *Rock-Color Ch (GSA, 1948).

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO.

CP3

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	MOLE NO. CP3-			
SITE Maywood Inter. Storage Pile			COORDINATES N 9885.0; E 9762.0				ANGLE FROM HORIZ Vertical		BEARING -----			
BEGUN 10-2-90	COMPLETED 10-2-90	DRILLER Hydro Group Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 12.2	ROCK (FT.) 0.0	TOTAL DE 12.2			
CORE RECOVERY (FT./%) 2.9/69*		CORE BOXES 0	SAMPLES 2**	EL. TOP CASING NA	GROUND EL. 80.5	DEPTH/EL. GROUND WATER 7 / NA 3 / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN MOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel						
SAMP. TYPE SAND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. N° BLOGS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYWD)	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
								80.5			0.0 - 8.0 ft: See Hole CP3.	Complete borehole number is B3890CP3-1. Samples between 1 - 8.0' were obtained from Hole CP3. Hole advanced by driving 3" OD spl spoon samplers. Borehole sampled TMA/Eberline Co
SS	2.0	1.5						72.5			8.0 - 11.4 ft: FILL; Sandy SILT, (SM); Grayish black (N2), moist.	
								71.0				
SS	2.2	1.4						70.5	10			
								69.1				
								68.8			TOTAL DEPTH = 12.2 FT.	Spoon refusal at 1 borehole complete. Borehole backfill with cuttings and sand upon completion.
* Core recovery % to total soil & rock sample. ** Number of chemical samples to lab. Ground elevation estimated from site topographic map Description & classification by visual examination of sample. Colors from *Rock-Color Chart (GSA, 1948).												
SS = SPLIT SPOON; ST = SHELBY TUBE; SITE O = DENNISON; P = PITCHER; Q = OTHER										Maywood Inter. Storage Pile Last Update: 06-10-91		MOLE NO. CP3-1

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP4				
SITE Maywood Inter. Storage Pile			COORDINATES N 9900.0; E 9800.0			ANGLE FROM HORIZ Vertical		BEARING -----				
BEGUN 10-2-90	COMPLETED 10-2-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 5.6	ROCK (FT.) 0.0	TOTAL DEP. 5.6			
CORE RECOVERY (FT./%) 4.7/84*		CORE BOXES 0	SAMPLES 1**	EL. TOP CASING NA	GROUND EL. 79.0	DEPTH/EL. GROUND WATER / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LEN. IN. CORE RECOVERY	LOSS IN G.P.H.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.7						79.0			0.0 - 5.6 ft. FILL; Gravelly, Silty SAND, (SW); Dark reddish brown (10R3/4), moist.	Complete borehole number is B3890CF
SS	2.0	1.5						77.3 77.0				Hole advanced by driving 3" OD split spoon samplers.
SS	1.6	1.5						75.5 75.0				Borehole sampled by TMA/Eberline Cor.
								73.5 73.4			TOTAL DEPTH = 5.6 FT.	Spoon refusal at 5.4 sandstone block in end of core cutter; hole abandoned. Borehole backfilled with cuttings and sand upon completion.
* Core recovery ref to total soil & rock sample. ** Number of chemical samples to lab. Ground elevation estimated from site topographic map. Description & classification by visual examination sample. Colors from *Rock-Color Char (GSA, 1948).												

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO

CP4

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP4-1		
SITE Maywood Inter. Storage Pile				COORDINATES N 9900.0; E 9797.0			ANGLE FROM HORIZ BEARING Vertical -----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-2-90	10-2-90	Hydro Group, Inc.		Tripod		3"	10.7	0.0	10.7		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
3.4/72*		0	4**	NA	79.0	7 / NA 3 / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knüttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. IN" CORE REC.	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD)		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
									DESCRIPTION AND CLASSIFICATION		
									0.0 - 6.0 ft: See Hole CP4.		
									6.0 - 10.7 ft: FILL; Sandy, Gravelly SILT (SW); Grayish black (N2), soft, moist.		
SS	2.0	1.9				73.0					
SS	2.0	0.8				71.1 71.0 70.2					
SS	0.7	0.7				69.0 68.3	10				
TOTAL DEPTH = 10.7 FT.									Spoon refusal at 10.7 borehole completed. Borehole backfilled with cuttings and sand upon completion.		
									* Core recovery refe to total soil & rock sample. ** Number of chemical samples se: to lab. Ground elevation estimated from site topographic map. Description & classification by visual examination sample. Colors from "Rock-Color Chart" (GSA, 1948).		

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO.

CP4-1

Bechtel GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	MOLE NO.					
				FUSRAP	14501	1 OF 1	CP5					
SITE			COORDINATES			ANGLE FROM HORIZ BEARING						
Maywood Inter. Storage Pile			N 9910.0; E 9830.0			Vertical -----						
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEP				
10-11-90	10-11-90	Hydro Group, Inc.		Crane and hammer	3"	8.5	0.0	8.5				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
5.1/68*		0	4**	NA	73.0	7 / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN MOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knüttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. N° BLOWS IN CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS ON G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.2					73.0				(Template: MYWD)	
							71.8			0.0 - 7.6 ft: FILL.	Complete borehole number is B3890C	
							71.0			0.0 - 1.2 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6).		
SS	2.0	1.1					69.9			2.0 - 7.6 ft: Sandy SILT, (ML); Blackish red (5R2/2).		Borehole sampled TMA/Eberline Co.
							69.0					Hole advanced to depth by 3" OD sp spoon samplers.
SS	2.0	1.2					67.8					
							67.0					
SS	2.5	1.6					65.4					
							64.5					
TOTAL DEPTH = 8.5 FT.											Borehole complete at 8.5'.	
											Borehole backfilled with cuttings and sand upon completion.	
											* Core recovery re to total soil & roc. sample.	
											** Number of chemical samples to lab.	
											Ground elevation estimated from sit topographic map.	
											Description & classification by visual examination sample.	
											Colors from *Rock-Color Cha (GSA, 1948).	
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE	MOLE NO.
Maywood Inter. Storage Pile											Last Update: 06-10-91	CP5

Bechtel GEOLOGIC DRILL LOG										PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	MOLE NO. CP
SITE Maywood Inter. Storage Pile				COORDINATES N 9810.0; E 9575.0				ANGLE FROM HORIZ BEARING Vertical -----							
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL C						
10-3-90	10-3-90	Hydro Group, Inc.		Tripod		3"	12.5	0.0	12.						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK							
7.9/63°		0	4**	NA	77.0	NA / NA		NA/NA							
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:									
140 lbs/30 in			none			Stephen Knüttel									
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LEN IN" CORE REC.	LOSS IN G.P.M	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E				
					PRESS. P.S.I.	TIME MIN.									
SS	2.0	1.4					77.0			0.0 - 11.1 ft: FILL	Complete borehole number is B3894				
							75.6			0.0 - 3.3 ft: SAND, (SW); Moderate reddish brown (10R4/6), with gravel and silt, slightly moist.					
SS	2.0	1.3					75.0								
							73.7								
SS	2.0	1.4					73.0			4.0 - 7.4 ft: Silty SAND, (SM); Blackish red (5R2/2), moist.		Borehole sample TMA/Eberline			
							71.6	5							
SS	2.0	1.4					71.0					Hole advanced depth by 3" OD spoon samplers.			
							69.6								
SS	2.0	1.3					69.0			8.0 - 11.1 ft: Gravelly SILT, (ML); Grayish Black (N2), moist.					
							67.7								
SS	2.5	1.1					67.0	10							
							65.9								
							64.5								
										TOTAL DEPTH = 12.5 FT.	Borehole complete at 12.5'. Borehole backfilled with cuttings and sand upon completion.				
* Core recover to total soil & sample. ** Number of chemical samp to lab. Ground elevat estimated from topographic m Description & classification by visual examinat sample. Colors from "Rock-Color" (GSA, 1948).															

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE Maywood Inter. Storage Pile Last Update: 06-10-91 MOLE NO. CP6

Bechtel				PROJECT		JOB NO.	SHEET NO.	HOLE NO.
GEOLOGIC DRILL LOG				FUSRAP		14501	1 OF 1	CP7
SITE			COORDINATES			ANGLE FROM HORIZ BEARING		
Maywood Inter. Storage Pile			N 9830.0; E 9620.0			Vertical -----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DE
9-26-90	9-26-90	Hydro Group, Inc.		Tripod	3"	12.3	0.0	12.3
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK
7.4/60*		0	4**	NA	78.0	7 / NA 4 / NA		NA/NA
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:		
140 lbs/30 in			none			Stephen Knüttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LEN. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5					78.0				(Template: MYWD)	
SS	2.0	1.4					76.5				0.0 - 11.1 ft: FILL.	Complete borehole number is B3890C
SS	2.0	1.5					76.0				0.0 - 4.5 ft: Sandy GRAVEL to Gravelly SAND (GW - SW); Dark reddish brown (10R3/4) to Grayish red (10R4/2), loose, moist.	
SS	2.0	1.1					74.6				Borehole sampled TMA/Eberline Co	
SS	2.0	1.1					74.0					
SS	2.0	0.8					72.5	5			4.5 - 11.1 ft: Silty SAND, (SM); Grayish black (N2), with varying amounts of gravel, granitic pebble filling core barrel between 6.8 - 7.1', granitic fragments between 12.0 - 12.3'.	
SS	2.0	1.1					72.0				Hole advanced to depth by 3" OD spoon samplers.	
SS	2.3	1.1					70.9					
							70.0					
							69.2					
							68.0	10				
							66.9					
							65.7					
TOTAL DEPTH = 12.3 FT.											Spoon refusal at 12 borehole completed	
											Borehole backfilled with cuttings and sand upon completion.	
											* Core recovery ref to total soil & rock sample.	
											** Number of chemical samples to lab.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination sample.	
											Colors from *Rock-Color Chart (GSA, 1948).	

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE
D = DENNISON; P = PITCHER; O = OTHER

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO.

CP7

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP		
SITE Maywood Inter. Storage Pile			COORDINATES N 9836.0; E 9650.0				ANGLE FROM HORIZ BEARING Vertical -----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL D		
9-27-90	9-27-90	Hydro Group, Inc.		Tripod		3"	4.0	0.0	4.1		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
2.1/53*		0	1**	NA	79.0	7 / NA 3 / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN NOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knüttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. "N" CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: NYWD)	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.6					79.0			0.0 - 2.6 ft: FILL; Sandy SILT to Silty SAND, (ML - SM); Grayish red (5R4/2) to Blackish red (5R2/2), moist.	Complete borehole number is B3890
SS	2.0	0.5					77.4 77.0 76.5				Borehole sample TMA/Eberline C
							75.0			TOTAL DEPTH = 4.0 FT.	Hole advanced to depth by 3" OD spoon samplers.
											Hole abandoned 4.0' because of insufficient recovery and angle of entry.
											Borehole backfill with cuttings on completion.

* Core recovery to total soil & rock sample.

** Number of chemical sample to lab.

Ground elevation estimated from topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1943).

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER	SITE Maywood Inter. Storage Pile	Last Update: 06-10-91	HOLE NO. CP8
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Bechtel GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP	14501	1 OF 1	CP8-					
SITE			COORDINATES			ANGLE FROM NORTH BEARING						
Maywood Inter. Storage Pile			N 9836.0; E 9648.0			Vertical -----						
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
9-27-90	9-27-90	Hydro Group, Inc.		Tripod	3"	12.4	0.0	12.4				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	ELEV. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
8.1/78*		0	5**	NA	79.0	NA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in			none		Stephen Knüttel							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPL. LF. % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
							79.0				(Template: ATMO)	
							77.0		0.0 - 3.0 ft: See Hole CP8.		Complete borehole number is B3890CP8-1.	
SS	2.0	1.4					75.6		2.0 - 11.9 ft: FILL: Sandy SILT, (ML); Grayish black (N2) to Black (N1), with varying amounts of gravel, granitic gravel between 4.0 - 4.4', moist, wet in places below 6.0'.		Samples between 0 - 2.0' were obtained from Hole CP8.	
SS	0.4	0.4					75.0					
SS	1.6	1.1					73.5	5			Hole advanced to depth by 3" OD sp spoon samplers.	
SS	2.0	1.8					73.0					
SS	2.0	1.5					71.2				Borehole sampled by TMA/Eberline Co.	
SS	2.4	1.9					69.5					
							69.0	10				
							67.1				Hole stopped at 12 because of drilling problems.	
							66.6					
TOTAL DEPTH = 12.4 FT.											Borehole backfilled with cuttings and sand upon completion.	
											* Core recovery rel to total soil & rock sample.	
											** Number of chemical samples s to lab.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination sample.	
											Colors from "Rock-Color Char (GSA, 1948).	
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER				SITE				Maywood Inter. Storage Pile		Last Update: 06-10-91		HOLE NO. CP8-1

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO CP		
SITE Maywood Inter. Storage Pile			COORDINATES N 9850.0; E 9700.0				ANGLE FROM HORIZ Vertical		BEARING ----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL D		
9-28-90	9-28-90	Hydro Group, Inc.		Tripod		3"	5.9	0.0	5.9		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
3.9/66°		0	2**	NA	80.5	NA / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knüttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. LEN. CORE	SAMPLE BLOKS IN. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.4					80.5			(Template: NYLD)	
							79.2			0.0 - 5.4 ft: FILL.	Complete borehole number is B3890
							78.5			0.0 - 1.3 ft: SAND, (SW); Dark reddish brown (10R3/4), with gravel, sand is fine to medium, slightly moist.	Borehole sample: TMA/Eberline C
SS	2.0	1.2					77.3			2.0 - 3.2 ft: Gravelly SILT, (ML); Blackish red (5R2/2), moist.	Hole advanced to depth by 3" OD spoon samplers.
							76.5			4.0 - 4.8 ft: Same as 0.0 - 1.3'.	
SS	1.9	1.4					75.1	5-		4.8 - 5.4 ft: Same as 2.0 - 3.2'.	
							74.6				
TOTAL DEPTH = 5.9 FT.										Spoon refusal at hole abandoned.	
										Borehole backfill with cuttings and sand upon completion.	
										* Core recovery to total soil & r sample.	
										** Number of chemical sample to lab.	
										Ground elevatio estimated from topographic ma	
										Description & classification by visual examinat sample.	
										Colors from "Rock-Color Ct (GSA, 1948).	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE Maywood Inter. Storage Pile
Last Update: 06-10-91

HOLE NO. CP9

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP9		
SITE Maywood Inter. Storage Pile				COORDINATES N 9847.0; E 9696.0			ANGLE FROM HORIZ BEARING Vertical				
BEGUN 9-28-90	COMPLETED 9-28-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 10.1	ROCK (FT.) 0.0	TOTAL D 10.		
CORE RECOVERY (FT./X) 2.8/68"		CORE BOXES 0	SAMPLES 2**	SEL. TOP CASING NA	GROUND EL. 80.5	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel					
(Template: MYWD)											
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LF. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL CHARACTER OF DRILLING, E
					PRESS. P.S.I.	TIME MIN.					
							80.5			0.0 - 6.0 ft: See Hole CP9.	Complete borehole number is B3890CP9-1.
							74.5			6.0 - 9.8 ft: FILL: Gravelly, Sandy SILT, (ML); Grayish black (N2), granitic gravel, Pale red (10R6/2), between 9.3 - 9.8', moist.	Samples between - 6.0' were obtained from Hole CP9. Hole advanced to depth by 3" OD spoon samplers. Borehole sample: TMA/Eberline C
							73.3				
							72.5				
							70.9				Spoon refusal at Additional spoon attempted, refusal 10.1'. Chisel failed to penetrate obstruction; hole abandoned. Borehole backfill with cuttings and sand upon completion.
							70.4	10		TOTAL DEPTH = 10.1 FT.	
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER										* Core recovery to total soil & re sample. ** Number of chemical sample to lab. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Ch (GSA, 1948).	
SITE Maywood Inter. Storage Pile										Last Update: 08-10-91 HOLE NO. CP9-1	

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP9-		
SITE Maywood Inter. Storage Pile				COORDINATES N 9840.0; E 9700.0			ANGLE FROM HORIZ Vertical		BEARING -----		
BEGUN 10-1-90	COMPLETED 10-1-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 19.0	ROCK (FT.) 0.0	TOTAL DE 19.0		
CORE RECOVERY (FT./%) 6.7/74°		CORE BOXES 0	SAMPLES 3**	ELEV. TOP CASING NA	GROUND EL. 80.5	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LEN CORE REC.	LOSS ON G.P.M	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
					PRESS. P.S.T.	TIME MIN.					
							80.5			(Template: MYMO)	
										0.0 - 6.0 ft: See Hole CP9.	Complete borehole number is B3890CP9-2.
											Samples between 1 - 6.0' were obtained from Hole CP9.
										6.0 - 10.0 ft: See Hole CP9-1.	Samples between 6 - 10.0' were obtained from Hole CP9-1.
											Hole advanced to depth by 3" OD spoon samplers.
SS	2.2	1.1					70.5	10		10.0 - 19.0 ft: FILL; Gravelly, Sandy SILT, (ML); Grayish black (N2), granitic gravel, Pale red (10R6/2), between 10.2 - 10.5', moist to wet, very soft below 15.0'.	Borehole sampled TMA/Eberline Co.
							69.4				
SS	2.4	1.9					68.3				Borehole complete at 19.0'.
							66.4				Borehole backfilled with cuttings and sand upon completion.
SS	2.4	1.7					65.9	15			
							64.2				
SS	2.0	2.0					63.5				* Core recovery re to total soil & rock sample.
							61.5				** Number of chemical samples to lab.
TOTAL DEPTH = 19.0 FT.										Ground elevation estimated from site topographic map.	Description & classification by visual examination sample.
										Colors from "Rock-Color Char (GSA, 1948).	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE
Maywood Inter. Storage Pile
Last Update: 06-10-91
HOLE NO
CP9-2

Bechtel GEOLOGIC DRILL LOG										PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	MOLE NO. CP10
SITE Maywood Inter. Storage Pile				COORDINATES N 9865.0; E 9755.0				ANGLE FROM HORIZ BEARING Vertical						
BEGUN 9-20-90	COMPLETED 9-20-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 2.0	ROCK (FT.) 0.0	TOTAL DEPTH 2.0					
CORE RECOVERY (FT./%) 1.0/50*		CORE BOXES 0	SAMPLES 0**	EL. TOP CASING NA	GROUND EL. 80.5	DEPTH/EL. GROUND WATER / NA		DEPTH/EL. TOP OF ROCK NA/NA						
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN MOLE: DIA./LENGTH none			LOGGED BY: Robert Cook								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BL. IN	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC	
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.0						80.5				0.0 - 2.0 ft: Soils not described, see Hole CP10-3.	Complete borehole number is B3890CP10.	
								78.5				TOTAL DEPTH = 2.0 FT.	Hole advanced to depth by 3" OD sp. spoon samplers. Hole abandoned at 2.0' because of insufficient recover. Borehole backfilled with cuttings and sand upon completion.	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

MOLE NO. CP10

* Core recovery ref to total soil & rock sample.

** Number of chemical samples see to lab.

Ground elevation estimated from site topographic map.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 of 1	HOLE NO. CP10-						
SITE Maywood Inter. Storage Pile			COORDINATES N 9859.0; E 9755.0				ANGLE FROM HORIZ BEARING Vertical		-----						
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DE						
9-20-90	9-20-90	Hydro Group, Inc.		Tripod		3"	0.9	0.0	0.9						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK							
0.0/0*		0	0**	NA	80.5	V / NA W / NA		NA/NA							
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:									
140 lbs/30 in			none			Robert Cook									
SAMP TYPE	SAMP DIA.	SAMP ADV.	SAMP REC.	SAMP REC.	SAMP IN	SAMP RECOVERY	LOSS IN G.P.M	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SIDE	DESCRIPTION AND CLASSIFICATION (Template: NYLD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
								PRESS. P.S.I.	TIME MIN.						
SS	0.9		0.0							80.5				0.0 - 0.9 ft: Soils not described, see Hole CP10-3.	Complete borehole number is B3890CP10-1. Spoon refusal at 0.9 ft hole abandoned. Borehole backfilled with cuttings and sand upon completion.
										79.6				TOTAL DEPTH = 0.9 FT.	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO. CP10-1

* Core recovery ref to total soil & rock sample.
** Number of chemical samples sent to lab.
Ground elevation estimated from site topographic map.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP10-2				
SITE Maywood Inter. Storage Pile			COORDINATES N 9865.0; E 9745.0			ANGLE FROM HORIZ Vertical		BEARING -----				
BEGUN 9-20-90	COMPLETED 9-20-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 3"	OVERBURDEN 0.8	ROCK (FT.) 0.0	TOTAL DEPTH 0.8				
CORE RECOVERY (FT./%) 0.0/0*		CORE BOXES 0	SAMPLES 0**	E.L. TOP CASING NA	GROUND EL. 80.5	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP REC. CORE REC.	SAMP. L. N. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	0.8	0.0					80.5				0.0 - 0.8 ft: Soils not described, see Hole CP10-3.	Complete borehole number is B3890CP10-2. Spoon refusal at 0.8'; hole abandoned. Borehole backfilled with cuttings and sand upon completion.
							79.7				TOTAL DEPTH = 0.8 FT.	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE: Maywood Inter. Storage Pile
 Last Update: 06-10-91
 HOLE NO.: CP10-2

* Core recovery refers to total soil & rock sample.
 ** Number of chemical samples sent to lab.
 Ground elevation estimated from site topographic map.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP10-			
SITE Maywood Inter. Storage Pile				COORDINATES N 9862.0; E 9758.0			ANGLE FROM HORIZ Vertical		BEARING -----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEP			
9-20-90	9-20-90	Hydro Group, Inc.		Tripod		3"	12.0	0.0	12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.6/63%		0	6**	NA	80.5	V / NA W / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Robert Cook						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LEN. IN" CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SUBPILE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN CHARACTER OF DRILLING, ET
				LOSS IN G.P.H.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6					80.5				0.0 - 10.6 ft: FILL.	Complete borehole number is B3890CP10-3. Hole advanced by driving 3" OD split spoon samplers. Borehole sampled TMA/Eberline Co Borehole backfill with cuttings and sand upon completion. Borehole complet at 12.0'.
SS	2.0	1.6					78.9				0.0 - 1.6 ft: Silty SAND, (SM); Grayish brown (5YR3/2), sand - 60%, silt - 30%, gravel - 10%, cobbles up to 1-2" diameter, dry.	
SS	2.0	1.6					78.5				2.0 - 3.5 ft: Same as above.	
SS	2.0	1.3					77.0				4.0 - 5.3 ft: Same as above, color change to Olive black (5Y2/1) at 4.6'.	
SS	2.0	1.4					76.5				6.0 - 7.4 ft: Same as above, gravel 5-10%.	
SS	2.0	1.2					75.2	5			8.0 - 9.2 ft: Same as above, cobbles up to 2" diameter, wood fragments 2-3", dry to slightly moist.	
SS	2.0	1.2					74.5				10.0 - 10.6 ft: Same as above, brick 3" diameter in barrel.	
SS	2.0	0.6					73.1					
							72.5					
							71.3					
							70.5	10				
							69.9					
							68.5					
TOTAL DEPTH = 12.0 FT.												

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO. CP10-

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP11				
SITE Maywood Inter. Storage Pile			COORDINATES N 9870.0; E 9805.0				ANGLE FROM HORIZ Vertical		BEARING -----				
BEGUN 9-20-90	COMPLETED 9-20-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 3"	OVERBURDEN 2.7	ROCK (FT.) 0.0	TOTAL DEP 2.7					
CORE RECOVERY (FT./%) 1.6/59*		CORE BOXES 0	SAMPLES 0**	EL. TOP CASING NA	GROUND EL. 80.0	DEPTH/EL. GROUND WATER NA/NA		DEPTH/EL. TOP OF ROCK NA/NA					
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: R. Cook							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LEN. IN. B/S	RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: NYLD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.6						80.0				0.0 - 1.6 ft: FILL.	Complete borehole number is B3890CP11. Hole advanced by driving 3" OD split spoon samplers. Borehole sampled by TMA/Eberline Cor Spoon refusal at 2'. Borehole backfilled with cuttings and sand upon completion.
								78.4				0.0 - 1.6 ft: Silty SAND, (SM); Moderate brown (5YR3/4), sand 60%, silt 30%, gravel 10-20%, gravel size cobbles up to 1/2" to 3/4". 0.0-0.6' very moist. 6"-1.6' moisture level decreasing.	
SS	0.7	0.0						77.3				TOTAL DEPTH = 2.7 FT.	

* Core recovery re: to total soil & rock sample.

** Number of chemical samples to lab.

Ground elevation estimated from site topographic map.

Description & classification by visual examination: sample.

Colors from *Rock-Color Chart (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP11		
SITE Maywood Inter. Storage Pile			COORDINATES N 9864.0; E 9801.0				ANGLE FROM HORIZ Vertical		BEARING -----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DE		
9-20-90	9-20-90	Hydro Group, Inc.		Tripod		3"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
4.2/70*		0	2**	NA	80.0	V / NA W / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN MOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			R. Cook					
SAMP TYPE SAND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. IN* CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS RETURN CHARACTER OF DRILLING, ET
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.					
							80.0			(Template: MYMD)	
							78.0			0.0 - 3.0 ft: See Hole CP11.	Complete borehole number is B3890CP11-1.
SS	2.0	1.1*					76.9			2.0 - 7.6 ft: FILL; Silty SAND, (SM); Moderate brown (5YR3/4) changing to Olive black (5Y2/1) at 5.5', Dark reddish brown (10R3/4) between 6.8 - 7.5'; sand -60%, medium grained; silt -20 - 30%, gravel -10 - 20%, cobbles up to 1" in diameter; moisture level decreases with depth.	Hole advanced by driving 3" OD spl spoon samplers.
SS	2.0	1.5*					76.0				Borehole sampled TMA/Eberline Co
SS	2.0	1.6					74.4 74.0				* Recovery (2 - 4 not recorded; >1. minimum recover needed to continu hole.
							72.4 72.0				* Recovery (4 - 6 not recorded; >1. recorded color change.
										TOTAL DEPTH = 8.0 FT.	Spoon refusal at 8 ft Borehole backfill with cuttings and sand upon completion.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP11-		
SITE Maywood Inter. Storage Pile			COORDINATES N 9880.0; E 9805.0				ANGLE FROM HORIZ BEARING Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DE		
9-20-90	9-20-90	Hydro Group, Inc.		Tripod		3"	13.0	0.0	13.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
1.1/22*		0	1**	NA	80.0	7 / NA 3 / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			R. Cook					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMP. IN. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS RETURN CHARACTER OF DRILLING, ET
					PRESS. P.S.I.	TIME MIN.					
							80.0			(Template: MWD)	
										0.0 - 8.0 ft: See hole CP11-2.	Complete borehole number is B3890CP11-2. Hole advanced by driving 3" OD spl spoon samplers. Samples between - 8.0' were obtain from Hole CP11-1 Borehole sampled TMA/Eberline C
SS	2.0	0.4					72.0 71.6			8.0 - 12.3 ft: FILL; Silty SAND, (SM); Olive black (5Y2/1), sand - 60%, silt - 25%, gravel - 5 - 10%. Moist.	
SS	2.0	0.4					70.0 69.6	10			
SS	1.0	0.3					68.0 67.7 67.0				
										TOTAL DEPTH = 13.0 FT.	Spoon refusal at : Borehole backfill with cuttings and sand upon completion.
											* Core recovery r to total soil & roc sample. ** Number of chemical samples to lab. Ground elevation estimated from si topographic map Description & classification by visual examinatio sample. Colors from "Rock-Color Ch (GSA, 1948).

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE

Maywood Inter. Storage Pile Last Update: 06-10-91 HOLE NO. CP11-

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP1		
SITE Maywood Inter. Storage Pile			COORDINATES N 9875.0; E 9815.0				ANGLE FROM HORIZ Vertical		BEARING ----		
BEGUN 10-2-90	COMPLETED 10-2-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 9.6	ROCK (FT.) 0.0	TOTAL F 9.1		
CORE RECOVERY (FT./%) 5.6/58*		CORE BOXES 0	SAMPLES 4**	EL. TOP CASING NA	GROUND EL. 77.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel					
(Template: MYMD)											
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE LF. CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E
SS	2.0	1.6					77.0			0.0 - 9.0 ft: FILL	Complete borehole number is B3890CP12. Hole advanced 1 driving 3" OD spoon samplers. Borehole sample TMA/Eberline
							75.5			0.0 - 1.5 ft: SAND with minor silt and gravel, (SW); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 2.0', slightly moist, loose.	
SS	2.0	1.4					75.0				
							73.6				
SS	2.0	0.6					73.0			4.0 - 9.0 ft: Sandy SILT with gravel, (SW); Blackish red (5R2/2), moist.	
							72.4				
							71.0				
SS	2.0	1.1					69.9				
							69.0				
SS	1.6	1.0					68.0				
							67.4				
TOTAL DEPTH = 9.6 FT.										Spoon refusal a Borehole backfill with cuttings in sand upon completion.	
										* Core recover to total soil & sample.	
										** Number of chemical samp to lab.	
										Ground elevat estimated from topographic m	
										Description & classification b visual examin: sample.	
										Colors from *Rock-Color (GSA, 1948).	

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CPI				
SITE Maywood Inter. Storage Pile			COORDINATES N 9875.0; E 9842.0				ANGLE FROM HORIZ BEARING Vertical -----						
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DI				
10-5-90	10-5-90	Hydro Group, Inc.		Crane and hammer		3"	4.0	0.0	4.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
3.2/80*		0	2**	NA	66.0	NA / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			Stephen Knüttel							
SAMP TYPE AND DIAM.	SAMP ADV. LEN CORE	SAMP REC. CORE REC.	SAMP N°	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYMD)	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E
					LOSS IN G.P.H	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.2						66.0				0.0 - 4.0 ft: FILL; Silty SAND, (SM); Blackish red (5R2/2), dry, loose.	Complete borehole number is B3890CPI3.
								64.8					Borehole sampler TMA/Eberline C
SS	2.0	2.0						64.0					Hole advanced to depth by 3" OD spoon samplers.
								62.0					
												TOTAL DEPTH = 4.0 FT.	Borehole completed at 4.0'.
													Borehole backfill with cuttings and sand upon completion.
													* Core recovery to total soil & n sample.
													** Number of chemical sample to lab.
													Ground elevatic estimated from topographic ma
													Description & classification by visual examinat sample.
													Colors from *Rock-Color CI (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP14				
SITE Maywood Inter. Storage Pile			COORDINATES N 9800.0; E 9550.0				ANGLE FROM HORIZ BEARING Vertical -----						
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPT				
9-26-90	9-26-90	Hydro Group, Inc.		Tripod		3"	12.0	0.0	12.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
8.9/74*		0	4**	NA	76.0	2 / NA 3 / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			R. Cook							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPL. N°	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
					LOSS LYN	G.P.M.	PRESS. P.S.I.							TIME MIN.
SS	2.0	1.8						76.0				0.0 - 11.1 ft: FILL	Complete borehole number is B3890CP14. Hole advanced by driving 3" OD split spoon samplers. Borehole sampled by TMA/Eberline Co:
SS	2.0	1.6					74.3 74.0					0.0 - 1.8 ft: Silty SAND, (SM); Moderate brown (5YR3/4), sand 70%, silt 20%, gravel >10%, dry.	
SS	2.0	1.5					72.4 72.0					2.0 - 3.6 ft: Same as above. 2.5 ft. Color change to Olive black (5Y2/1), dry, gravel 15 - 20%.	
SS	2.0	1.5					70.5 70.0	6				4.0 - 5.5 ft: Same as above.	
SS	2.0	1.5					68.5 68.0					6.0 - 6.4 ft: Same as above. 6.4 - 6.7 ft: SAND, (SM); Grayish black (N2), very fine has an appearance of fine coal dust, moist.	
SS	2.0	1.4					66.6 66.0					6.7 - 7.5 ft: Sand, silt & gravel, Olive black (5Y2/1).	
SS	2.0	1.1					64.9 64.0	10				8.0 - 9.4 ft: Same as above.	
TOTAL DEPTH = 12.0 FT.											Borehole complete at 12.0'. Borehole backfill with cuttings and sand upon completion.		

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE

Maywood Inter. Storage Pile Last Update: 06-10-91 HOLE NO. CP14

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	MOLE NO. CP15			
SITE Maywood Inter. Storage Pile				COORDINATES N 9800.0; E 9600.0			ANGLE FROM NORTH BEARING Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
9-26-90	9-26-90	Hydro Group, Inc.		Tripod		3"	3.6	0.0	3.6			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
1.8/50*		0	0**	NA	78.5	2 / NA 3 / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN MOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Robert Cook						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	BL. SAMPLE IN- CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.8					78.5				0.0 - 1.8 ft: FILL; Moderate brown (8YR3/4), sand -65%, silt -45%; gravel is Dark reddish brown (10R3/4), -5%.	Complete borehole number is B3890CP15.
SS	1.6	0.0					76.7					Hole advanced to depth by 3" OD s; spoon samplers.
							74.9					Spoon refusal at 3 Chisel failed to m obstruction; hole abandoned.
TOTAL DEPTH = 3.6 FT.											Borehole backfill with cuttings and sand upon completion.	

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP1		
SITE Maywood Inter. Storage Pile				COORDINATES N 9808.0; E 9600.0				ANGLE FROM HORIZ Vertical		BEARING ----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL		
9-26-90	9-26-90	Hydro Group, Inc.		Tripod		3"	2.0	0.0	2.		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
0.0/0*		0	0**	NA	78.5	/ MA / MA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Robert Cook					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLINDS IN CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: NYMO)	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
							78.5			0.0 - 2.0 ft: Soils not described, see Hole CP15-5.	Complete borehole number is B3890CP15-1.
							76.5			TOTAL DEPTH = 3.0 FT.	Samples between - 4.0' obtained Hole CP15-5. Hole advanced depth by 3" OI spoon samplers Spoon refusal Chisel failed to obstruction; ho abandoned. Borehole backfilled with cuttings and sand upon completion.

* Core recoveries to total soil & sample.
** Number of chemical samples to lab (see Hole CP15-5).
Ground elevations estimated from topographic map.

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE
D = DENNISON; P = PITCHER; O = OTHER

Maywood Inter. Storage Pile
Last Update: 06-10-91
HOLE NO. CP15

Bechtel GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.									
				FUSRAP	14501	1 OF 1	CP15									
SITE			COORDINATES			ANGLE FROM HORIZ BEARING										
Maywood Inter. Storage Pile			N 9800.0; E 9590.0			Vertical ----										
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL I								
9-26-90	9-26-90	Hydro Group, Inc.		Tripod	3"	4.8	0.0	4.0								
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK								
0.0/0%		0	0**	NA	78.5	NA / NA		NA/NA								
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:										
140 lbs/30 in			none			Robert Cook										
SAMP TYPE AND DIAM.	SAMP. BODY LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BL. IN. % CORE RECOVERY	WATER PRESSURE TESTS				ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E			
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.	(Template: MYWD)									
								78.5				0.0 - 4.0 ft: Soils not described, see Hole CP15-8.	Complete borehole number is B3890CP15-2.			
SS	0.8	0.0						73.7				Samples between - 4.0' obtained in Hole CP15-5.	Hole advanced to depth by 3" OD spoon samplers.			
												TOTAL DEPTH = 4.8 FT.	Spoon refusal at			
													Chisel failed to obstruction; hole abandoned.			
													Borehole backfilled with cuttings as sand upon completion.			
													* Core recovery to total soil & 1 sample.			
													** Number of chemical samples to lab (see Hole CP15-5).			
													Ground elevation estimated from topographic map.			
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE		Last Update: 06-10-91		HOLE NO.	
Maywood Inter. Storage Pile											CP15-					

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP15-3			
SITE Maywood Inter. Storage Pile			COORDINATES N 9800.0; E 9591.0				ANGLE FROM HORIZ Vertical		BEARING -----			
BEGUN 9-26-90	COMPLETED 9-26-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 3.5	ROCK (FT.) 0.0	TOTAL DEPT. 3.5			
CORE RECOVERY (FT./%) 0.0/0%		CORE BOXES 0	SAMPLES 0**	EL. TOP CASING NA	GROUND EL. 78.5	DEPTH/EL. GROUND WATER / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. IN. BL. SOILS IN. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
							78.5					
							75.0				0.0 - 3.5 ft: Soils not described, see Hole CP15-5.	Complete borehole number is B3890CP15-3. Samples between 0.0 - 4.0' obtained from Hole CP15-5. Hole advanced to depth by 3" OD split spoon samplers. Spoon refusal at 3.5' Chisel failed to move; obstruction; hole abandoned. Borehole backfilled with cuttings and sand upon completion.
											TOTAL DEPTH = 3.5 FT.	

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE # CP1			
SITE Maywood Inter. Storage Pile				COORDINATES N 9793.0; E 9607.0				ANGLE FROM HORIZ BEARING Vertical ----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL					
10-2-90	10-2-90	Hydro Group, Inc.	Tripod	3"	3.2	0.0	3.					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	E.L. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
0.0/0*		0	0**	NA	78.5	NA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knüttel							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. IN* % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SHELBY	DESCRIPTION AND CLASSIFICATION (Template: MYMD)	NOTES ON: WATER LEVEL WATER RETURN CHARACTER (DRILLING, I)
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							78.5				0.0 - 3.2 ft: Soils not described, see Hole CP15-5.	Complete borah number is B3890CP15-4. Samples between - 4.0' obtained Hole CP15-5.
							75.3				TOTAL DEPTH = 3.2 FT.	Hole advanced depth by 3" OD spoon samplers. Spoon refusal a Chisel failed to obstruction; hole abandoned. Borehole backed with cuttings as sand upon completion.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP15	
SITE Maywood Inter. Storage Pile			COORDINATES N 9810.0; E 9595.0				ANGLE FROM HORIZ Vertical		BEARING ----	
BEGUN 10-2-90	COMPLETED 10-2-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 12.9	ROCK (FT.) 0.0	TOTAL 12.	
CORE RECOVERY (FT./%) 8.9/69*		CORE BOXES 0	SAMPLES 4**	SEL. TOP CASING NA	GROUND EL. 78.5	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA		
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel				
SAND TYPE SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. N° CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E
				PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.8				78.5			0.0 - 11.3 ft: FILL 0.0 - 3.5 ft: Silty SAND, (SM); Blackish red (5R2/2), to Moderate reddish brown (10R4/6), with gravel and asphalt, slightly moist.	Complete borehole number is B3890CP15-8.
SS	2.0	1.8				76.9 76.5				Borehole sample TMA/Eberline
SS	2.0	1.2				75.0 74.5			4.0 - 7.6 ft: Silty GRAVEL, (GM); Blackish red (5R2/2), slightly moist.	Hole advanced 1 depth by 3" OD spoon samplers.
SS	2.0	1.6				73.3 72.5	5			
SS	2.0	1.7				70.9 70.5			8.0 - 11.3 ft: Sandy SILT, (ML); Grayish Black (N2), moist.	
SS	2.9	1.3				68.8 68.5	10			
						67.2				
						65.6				
TOTAL DEPTH = 12.9 FT.									Spoon refusal a borehole compl	Borehole backfill with cuttings a sand upon completion.
									* Core recovery to total soil & sample.	** Number of chemical sample to lab.
									Ground elevati estimated from topographic m	Description & classification b visual examin sample.
									Colors from *Rock-Color (GSA, 1948).	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO.

CP15.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP16			
SITE Maywood Inter. Storage Pile			COORDINATES N 9800.0; E 9650.0			ANGLE FROM HORIZ BEARING Vertical -----					
BEGUN 9-27-90	COMPLETED 9-27-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 19.0	ROCK (FT.) 0.0	TOTAL DE 19.0		
CORE RECOVERY (FT./%) 11.1/58*		CORE BOXES 0	SAMPLES 6**	EL. TOP CASING NA	GROUND EL. 79.0	DEPTH/EL. GROUND WATER 7 / NA 3 / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	BL. SAMP. IN. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.5					78.0		0.0 - 17.7 ft: FILL.	Complete borehole number is B3890CP16.	
							77.5		0.0 - 1.0 ft: Silty, Sandy GRAVEL, (GM); Moderate brown (5YR3/4) to Brownish black (5YR2/1).	Hole advanced by driving 3" OD spl. spoon samplers.	
SS	2.0	1.4					77.0		1.0 - 2.5 ft: GRAVEL; Fine sandstone fragments, Dark reddish brown (10R3/4).	Borehole sampled TMA/Eberline Ct	
							75.6		2.5 - 5.5 ft: Silty, Sandy GRAVEL, (GM); Moderate brown (5YR3/1) to Brownish black (5YR2/1) with possible coal sludge.		
SS	2.0	1.6					75.0				
							73.5	5			
SS	2.0	0.9					73.0		6.0 - 11.2 ft: Sandy SILT, (SM); Blackish red (5R2/2), possible coal sludge, soft, moist.		
							72.1				
							71.0				
SS	2.0	1.8					69.2			Spoon refusal at 1	
							69.0	10		O = Chisel driver 12.0' to move obstruction.	
SS	1.2	1.2					67.8				
O	0.8	0.0					67.0		12.0 - 13.8 ft: Sandy SILT, (SM); Grayish black (N2), abundant pebbles > 5 cm between 13.0 - 13.8', compact, moist.	Low recovery bet 15 - 19'; core cut; most likely pushed soft sediments down	
SS	3.0	1.8					65.2			Borehole complet at 19.0'.	
							64.0	15		Borehole backfill; with cuttings and sand upon completion.	
SS	2.4	0.7					63.3		15.0 - 15.7 ft: GRAVEL; sandstone and Granitic compositions, >0.2', with silt		
							61.6				
SS	1.6	0.3					61.2		17.4 - 17.7 ft: Sandy SILT, (ML); Grayish black (N2), wet.	* Core recovery 1 to total soil & re-sample.	
							60.0			** Number of chemical samples to lab.	
									TOTAL DEPTH = 19.0 FT.	Ground elevation estimated from a topographic map	
										Description & classification by visual examination sample.	
										Colors from *Rock-Color Ch (GSA, 1948).	

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP		
SITE Maywood Inter. Storage Pile				COORDINATES N 9800.0; E 9700.0			ANGLE FROM HORIZ Vertical		BEARING ---		
BEGUN 9-27-90	COMPLETED 9-28-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 13.4	ROCK (FT.) 0.0	TOTAL 13		
CORE RECOVERY (FT./%) 8.6/64*		CORE BOXES 0	SAMPLES 5**	EL. TOP CASING NA	GROUND EL. 79.0	DEPTH/EL. GROUND WATER NA/NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel					
SAMP TYPE SAMP. DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. RECOVERY %	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SHELBY	DESCRIPTION AND CLASSIFICATION (Template: NYMO)	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING
				LOSS G.P.H.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.6					79.0		0.0 - 13.4 ft: FILL.	Complete borehole number is B3890CP17.	
							77.5		0.0 - 5.4 ft: Silty SAND, (SM); Dark reddish brown (10R3/4) to Blackish red (5R2/2), with sandstone gravel.	Borehole sample TMA/Eberline	
SS	2.0	1.6					77.0				
							75.4			Hole advanced depth by 3" OI spoon samplers	
SS	2.0	0.4					75.0				
							74.6				
O	1.0	0.0								Spoon refusal	
							72.0				
SS	2.0	1.3							7.0 - 8.2 ft: Gravelly SILT, (ML); Blackish red (5R2/2), with granitic gravel fragments.	O = Chisel driven 7.0' to move obstruction.	
							70.8				
							70.0				
SS	2.0	2.0							9.0 - 11.0 ft: Silty, Gravelly SAND, (SW); Grayish Black (N2), moist.	Spoon refusal	
							68.0				
SS	0.3	0.0									
O	1.3	0.0					67.5			O = Chisel driven 12.4' to move obstruction, no spoon hit refusal 13.4'; hole complete (Note: sediment recovery between 12.6' - 13.4' was greater than the interval driven).	
							65.6				
									TOTAL DEPTH = 13.4 FT.	Borehole backfilled with cuttings & sand upon completion.	
										* Core recovered to total soil & sample.	
										** Number of chemical samples to lab.	
										Ground elevation estimated from topographic map.	
										Description & classification from visual examination of sample.	
										Colors from Rock-Color (GSA, 1948).	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO.

CP1

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP1		
SITE Maywood Inter. Storage Pile				COORDINATES N 9820.0; E 9745.0				ANGLE FROM NORTH Vertical	BEARING ----		
BEGUN 9-19-90	COMPLETED 9-19-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 14.5	ROCK (FT.) 0.0	TOTAL D 14.		
CORE RECOVERY (FT./%) 10.2/70*		CORE BOXES 0	SAMPLES 5**	IEL. TOP CASING NA	GROUND EL. 80.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH LOGGED BY: none				R. Cook				
SAMP TYPE AND DIA.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LEN IN" BLINDS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL, WATER RETURN CHARACTER OF DRILLING, E
					LOSS IN G.P.H.	PRESS. P.S.F.					
(Template: NYLD)											
SS	2.0	1.7					80.0			0.0 - 14.45 ft: FILL. 0.0 - 1.7 ft: Silty SAND, (SM): Brownish black (5YR2/1), sand 40 - 60%, silt 10 - 20%, rounded to subrounded grains, dry.	Complete borehole number is B3890CP18.
SS	2.0	1.3					78.3 78.0			2.0 - 3.3 ft: Same as above, color change to Olive black (5Y2/1), with cobbles of igneous & red bed sediments, 2 - 3" in diameter.	Hole advanced to depth by 3" OD spoon samplers.
SS	2.0	1.6					76.7 76.0			4.0 - 5.6 ft: Same as above, less cobbles, red bed is Grayish red (10R4/3), dry.	Borehole sample TMA/Eberline C
SS	2.0	1.4					74.4 74.0			6.0 - 7.4 ft: Same as above, color change to Olive black (5Y2/1), cobbles up to 2" diameter.	
SS	2.0	1.2					72.6 72.0			8.0 - 9.2 ft: Same as above, moist.	
SS	2.0	1.6					70.8 70.0			10.0 - 11.6 ft: Same as above, cobbles up to 3" diameter.	
SS	2.0	1.0					68.4 68.0			12.0 - 13.0 ft: Same as above, dry.	
SS	0.6	0.4					67.0 66.0 65.6 65.3			14.0 - 14.4 ft: Same as above.	Spoon refusal at Borehole backfill with cuttings as sand upon completion.
TOTAL DEPTH = 14.5 FT.											
* Core recovery to total soil & r sample. ** Number of chemical sample to lab. Ground elevatic estimated from topographic ma Description & classification by visual examinal sample. Colors from *Rock-Color C (GSA, 1948).											

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE
 n = DEWISON; P = PITCHER; O = OTHER

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO. CP18

Bechtel GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP	14501	1 OF 1	CP					
SITE			COORDINATES			ANGLE FROM NORTH BEARING						
Maywood Inter. Storage Pile			N 9815.0; E 9800.0			Vertical ----						
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL I				
9-19-90	9-19-90	Hydro Group, Inc.		Tripod	3"	10.0	0.0	10				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.7/67*		0	3**	NA	79.5	NA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			NONE			R. Cook						
SAMP TYPE AND DIAM.	SAMP ADV. LEN CORE	SAMP REC. CORE REC.	DIMS IN" CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL CHARACTER OF DRILLING, E	
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS 2.0	1.5					79.5			0.0 - 0.5 ft: FILL.	Complete borehole number is B3890CP19. Hole advanced 1 driving 3" OD spoon samplers. Borehole sample TMA/Eberline		
						78.0			0.0 - 1.45 ft: Silty GRAVEL (GM); Brownish black (5YR2/1), gravel -80%, sand and silt 10 - 20%, 1-3" cobbles, dry, rounded to subangular grains.			
SS 2.0	1.5					77.6			2.0 - 3.5 ft: Brownish black (5YR2/1).			
SS 2.0	1.6					76.0			4.0 - 5.6 ft: Same as above, few 1-2" diameter cobbles.			
SS 2.0	1.5					75.5			6.0 - 7.5 ft: Same as above.			
SS 2.0	0.6					73.9			8.0 - 8.6 ft: Same as above, Brownish black (5YR2/1).			
						73.5						
						72.0						
						71.5						
						70.9						
						69.5	10		TOTAL DEPTH = 10.0 FT.	Hole abandoned 10.0' because of insufficient recovery. Borehole backfilled with cuttings at completion.		
* Core recovered to total soil & sample. ** Number of chemical samples to lab. Ground elevations estimated from topographic map. Description & classification from visual examination of sample. Colors from "Rock-Color" (GSA, 1948).												
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER				SITE				Maywood Inter. Storage Pile			Last Update: 06-10-91	HOLE NO. CP1

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP19-			
SITE Maywood Inter. Storage Pile			COORDINATES N 9815.0; E 9795.0				ANGLE FROM HORIZ BEARING Vertical					
BEGUN 9-19-90	COMPLETED 9-19-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 13.9	ROCK (FT.) 0.0	TOTAL DEPTH 13.9			
CORE RECOVERY (FT./%) 2.0/51*		CORE BOXES 0	SAMPLES 2**	SEL. TOP CASING NA	GROUND EL. 79.5	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH LOGGED BY: none			LOGGED BY: R. Cook						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE LEN. IN CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ETC	
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
							79.5			(Template: NYMO)		
										0.0 - 10.0 ft: See Hole CP19	Complete borehole number is B3890CP19-1. Hole advanced by driving 3" OD split spoon samplers. Borehole sampled TMA/Eberline Co.	
SS	2.0	0.7					69.5	10		10.0 - 13.3 ft: FILL. 10.0 - 10.65 ft: Silty GRAVEL (GM); Brownish black (5YR2/1), gravel -80%, sand and silt -10 - 20%, 1-3" cobbles, dry, rounded to subangular grains.	Samples between 6 - 8.0' were obtained from Hole CP19.	
SS	1.9	1.3					67.5			12.0 - 13.3 ft: Same as above, moist.	Spoon refusal at 1 borehole complete	
							66.2				Borehole backfilled with cuttings and sand upon completion.	
							65.6			TOTAL DEPTH = 13.9 FT.		
<ul style="list-style-type: none"> * Core recovery re to total soil & rock sample. ** Number of chemical samples : to lab. Ground elevation estimated from sit topographic map. Description & classification by visual examination sample. Colors from *Rock-Color Chart (GSA, 1948). 												
SS = SPLIT SPOON; ST = SHELBY TUBE; O = DENNISON; P = PITCHER; 0 = OTHER				SITE				Maywood Inter. Storage Pile Last Update: 06-10-91				HOLE NO. CP19-1

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP20					
SITE Maywood Inter. Storage Pile			COORDINATES N 9835.0; E 9815.0				ANGLE FROM HORIZ BEARING Vertical -----							
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPT					
10-1-90	10-1-90	Hydro Group, Inc.		Tripod		3"	12.0	0.0	12.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
7.1/59*		0	4**	NA	77.0	NA / NA		NA/NA						
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			Stephen Knüttel								
SAMP TYPE	SAMP DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE "N" CORE RECOVERY	LOSS LYN	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						G.P.H.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.1							77.0				(Template: NYWD)	
									75.9				0.0 - 11.0 ft: FILL.	Complete borehole number is B3890CP20. Hole advanced by driving 3" OD split spoon samplers. Borehole sampled by TMA/Eberline Corp.
SS	2.0	1.3						75.0				0.0 - 7.0 ft: Gravelly, Silty SAND, (GM); Moderate reddish brown (10R4/6), slightly moist.		
								73.7						
SS	2.0	1.6						73.0						
								71.5						
SS	2.0	1.4						71.0						
								69.6						
SS	2.0	0.8						69.0					7.0 - 11.0 ft: Silty SAND, (SM); Blackish red (5R2/2), darker and moister with depth.	
								68.3						
SS	2.0	1.0						67.0						
								66.0						
								65.0						
TOTAL DEPTH = 12.0 FT.													Borehole completed at 12.0'. Borehole backfilled with cuttings and sand upon completion.	
													* Core recovery ref to total soil & rock sample. ** Number of chemical samples s: to lab. Ground elevation estimated from site topographic map. Description & classification by visual examination sample. Colors from "Rock-Color Chart (GSA, 1948).	

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE Maywood Inter. Storage Pile Last Update: 06-10-91 HOLE NO. CP20

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	MOLE N CP			
SITE Maywood Inter. Storage Pile				COORDINATES N 9820.0; E 9843.0			ANGLE FROM HORIZ Vertical		BEARING ----			
BEGUN 10-5-90	COMPLETED 10-5-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Crane and hammer		SIZE 3"	OVERBURDEN 4.0	ROCK (FT.) 0.0	TOTAL 4.			
CORE RECOVERY (FT./X) 2.6/65°		CORE BOXES 0	SAMPLES 3**	EL. TOP CASING NA	GROUND EL. 67.0	DEPTH/EL. GROUND WATER / NA		DEPTH/EL. TOP OF ROC NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN MOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel						
SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LEN. BL. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYLD)	NOTES ON: WATER LEVEL WATER RETEN CHARACTER DRILLING, I
				LOSS IN G.P.H.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.3					67.0				0.0 - 3.4 ft: FILL.	Complete borehole number is B3890CP21. Borehole sample TMA/Eberline Hole advanced depth by 3" of spoon samplers Borehole complete at 4.0'. Borehole backfilled with cuttings and sand upon completion.
							65.8				0.0 - 1.2 ft: SAND, (SW); Moderate reddish brown (10R4/6), with gravel, slightly moist to dry, loose.	
SS	2.0	1.4					65.0				2.0 - 3.4 ft: Silty SAND, (SM); Dark reddish brown (10R3/4) changing to Blackish red (5R2/2) at 2.8', moist, wet below 3.0'.	
							63.6					
							63.0				TOTAL DEPTH = 4.0 FT.	

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE
 D = DENNISON; P = PITCHER; O = OTHER

Maywood Inter. Storage Pile Last Update: 06-10-91

MOLE NO. CP21

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP2'			
SITE Maywood Inter. Storage Pile			COORDINATES N 9799.0; E 9720.0			ANGLE FROM HORIZ BEARING Vertical -----					
BEGUN 10-3-90	COMPLETED 10-3-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 3"	OVERBURDEN 10.0	ROCK (FT.) 0.0	TOTAL DE 10.0			
CORE RECOVERY (FT./%) 6.5/65*		CORE BOXES 0	SAMPLES 5**	EL. TOP CASING NA	GROUND EL. 79.0	DEPTH/EL. GROUND WATER 7 / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel						
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE "N" BLOWS IN CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
				LOSS IN G.P.H.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.3					79.0			0.0 - 9.3 ft: FILL.	Completa borehole number is B3890CP22. Borehole sampler TMA/Eberline C Hole advanced to depth by 3" OD spoon samplers.
							77.7			0.0 - 5.3 ft: SAND, (SW); Moderate reddish brown (10R4/6), with gravel and silt, slightly moist.	
SS	2.0	1.1					77.0				
							75.9				
SS	2.0	1.3					75.0				
							73.7	5			
SS	2.0	1.5					73.0			6.0 - 7.5 ft: Silty SAND to Sandy SILT, (SM - ML); Blackish red (5R2/2), with gravel.	
							71.5				
SS	2.0	1.3					71.0			8.0 - 9.3 ft: Silty SAND, (SM); Grayish Black (N2), moist.	
							69.7				
							69.0	10		TOTAL DEPTH = 10.0 FT.	Spoon refusal at drill string bent obstruction; hole abandoned. Borehole backfill with cuttings and sand upon completion.

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91 HOLE NO.

CP22

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP22-			
SITE Maywood Inter. Storage Pile			COORDINATES N 9799.0; E 9718.0				ANGLE FROM HORIZ Vertical		BEARING -----			
BEGUN 10-3-90	COMPLETED 10-3-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 14.5	ROCK (FT.) 0.0	TOTAL DEP 14.5			
CORE RECOVERY (FT./%) 2.9/64*		CORE BOXES 0	SAMPLES 2**	EL. TOP CASING NA	GROUND EL. 79.0	DEPTH/EL. GROUND WATER / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH NONE			LOGGED BY: Stephen Knüttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LF. BLOWS "N" RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
							79.0				(Template: NYWD)	
											0.0 - 10.0 ft: See Hole CP22.	Complete borehole number is B3890CP22-1.
												Samples between 0 - 10.0' were obtained from Hole CP22.
												Hole advanced to depth by 3" OD spoon samplers.
												Borehole sampled TMA/Eberline Co
SS	2.0	1.1					69.0	10			10.0 - 13.8 ft: FILL: Silty SAND, (SM); Grayish Black (N2), moist.	
							67.9					
SS	2.5	1.8					67.0					
							65.2					Borehole complete at 14.5'.
							64.5					Borehole backfilled with cuttings and sand upon completion.
TOTAL DEPTH = 14.5 FT.												
											* Core recovery re to total soil & rock sample.	
											** Number of chemical samples to lab.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination sample.	
											Colors from "Rock-Color Chart" (GSA, 1948).	

Bechtel GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.							
				FUSRAP	14501	1 OF 1	CP2							
SITE			COORDINATES			ANGLE FROM HORIZ BEARING								
Maywood Inter. Storage Pile			N 9780.0; E 9765.0			Vertical -----								
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL D						
10-10-90	10-10-90	Hydro Group, Inc.		Crane and hammer	3"	6.0	0.0	6.0						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
2.3/38*		0	2**	NA	70.0	NA / NA		NA/NA						
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:									
140 lbs/30 in			none		Stephen Knüttel									
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. IN. BLONS. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E		
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.								
SS	2.0	1.1					70.0							
							68.9			0.0 - 3.3 ft. FILL: Silty SAND to Sandy SILT, (SM - ML); Dark reddish brown (10R3/4) to Blackish red (5R2/2).	Complete borehole number is B3890CP23.			
SS	2.0	1.2					68.0				Borehole sample TMA/Eberline (
							66.8				Hole advanced to depth by 3" OD spoon samplers.			
SS	2.0	0.0					64.0							
TOTAL DEPTH = 6.0 FT.											Hole abandoned 6.0' because of insufficient reco			
											Borehole backfill with cuttings as sand upon completion.			
											* Core recovery to total soil & 1 sample.			
											** Number of chemical sampl to lab.			
											Ground elevati estimated from topographic m:			
											Description & classification b visual examina sample.			
											Colors from *Rock-Color C (GSA, 1948).			
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE	Maywood Inter. Storage Pile	Last Update: 06-10-91	HOLE NO. CP2:

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	MOLE NO. CP23-1			
SITE Maywood Inter. Storage Pile				COORDINATES N 9780.0; E 9763.0				ANGLE FROM HORIZ BEARING Vertical -----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPT				
10-10-90	10-10-90	Hydro Group, Inc.		Crane and hammer	3"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
1.6/40*		0	2**	NA	70.0	NA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			NONE			Stephen Knüttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LEN. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
							70.0				(Template: MYWD)	
											0.0 - 4.0 ft: See Hole CP23.	Complete borehole number is B3890CP23-1. Samples between 0.1 - 4.0' were obtained from Hole CP23. Hole advanced to depth by 3" OD split spoon samplers.
SS	1.0	0.0										
SS	3.0	1.6					65.0	5			5.0 - 6.6 ft: FILL: Silty SAND to Sandy SILT, (SM - ML); Dark reddish brown (10R3/4) to Blackish red (5R2/2).	Borehole sampled by TMA/Eberline Corp Spoon driven from - 6.0' contained no recovery; next spoon hit resistance at -5' Spoon driven from - 8.0'.
							63.4					
							62.0				TOTAL DEPTH = 8.0 FT.	Borehole completed at 8.0'. Borehole backfilled with cuttings and sand upon completion.

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE
 O = DENNISOM; P = PITCHER; O = OTHER

Maywood Inter. Storage Pile Last Update: 06-10-91 HOLE NO. CP23-1

Bechtel GEOLOGIC DRILL LOG										PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP24
SITE Maywood Inter. Storage Pile				COORDINATES N 9802.0; E 9807.0				ANGLE FROM HORIZ Vertical		BEARING -----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL D					
10-4-90	10-4-90	Hydro Group, Inc.		Tripod		3"	6.7	0.0	6.7					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
0.0/0"		0	0**	NA	77.0	/ NA / MA		NA/NA						
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			Stephen Knüttel								
(Template: MYWD)														
DESCRIPTION AND CLASSIFICATION														
0.0 - 6.0 ft: Soils not described, see Hole CP24.														
SS 0.7 0.0 TOTAL DEPTH = 6.7 FT.														
NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E														
Complete borehole number is B3890CP24-1. Samples between - 6.0' were obtained from Hole CP24. Hole advanced to depth by 3" OD spoon samplers. Spoon refusal at hole abandoned. Borehole backfilled with cuttings as sand upon completion.														
* Core recovery to total soil & sample. ** Number of chemical samples to lab. Ground elevation estimated from topographic map														

Bechtel GEOLOGIC DRILL LOG										PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP24
SITE Maywood Inter. Storage Pile			COORDINATES N 9803.0; E 9809.0				ANGLE FROM HORIZ Vertical		BEARING -----					
BEGUN 10-4-90	COMPLETED 10-4-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 6.7	ROCK (FT.) 0.0	TOTAL DEP 6.7					
CORE RECOVERY (FT./%) 4.5/67*		CORE BOXES 0	SAMPLES 5**	EL. TOP CASING NA	GROUND EL. 77.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA						
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel								
SAMP TYPE SAMP. DIA. SAMP. ADV. LEN. CORE SAMPLE REC. CORE REC. SAMPLE N° BLOKS N° % CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MWD)		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETI					
		PRESS. P.S.I.	TIME MIN.											
SS	2.0	1.6		77.0			0.0 - 5.4 ft: FILL.		Complete borahole number is B3890CP24. Borahole sampled TMA/Eberline Co. Hole advanced to depth by 3" OD sp spoon samplers.					
				75.4			0.0 - 1.6 ft: SAND, (SW); Dark reddish brown (10R3/4), with silt and gravel, slightly moist.							
SS	2.0	1.5		75.0			2.0 - 5.4 ft: Silty SAND to Sandy SILT, (SM - ML); Blackish red (5R2/2), moist.							
SS	2.0	1.4		73.5										
				73.0										
SS	0.7	0.0		71.6	5				Spoon refusal at 6 hole abandoned. Borahole backfilled with cuttings and sand upon completion.					
				70.9			TOTAL DEPTH = 6.7 FT.							

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE

Maywood Inter. Storage Pile Last Update: 06-10-91 HOLE NO. CP24

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP24-				
SITE Maywood Inter. Storage Pile			COORDINATES N 9804.0; E 9811.0				ANGLE FROM HORIZ Vertical		BEARING -----				
BEGUN 10-4-90	COMPLETED 10-4-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 12.5	ROCK (FT.) 0.0	TOTAL DEP 12.5				
CORE RECOVERY (FT./%) 4.1/63*		CORE BOXES 0	SAMPLES 4**	EL. TOP CASING NA	GROUND EL. 77.0	DEPTH/EL. GROUND WATER V / NA W / NA		DEPTH/EL. TOP OF ROCK NA/NA					
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE IN*	CORE RECOVERY	LOSS IN G.P.M	WATER PRESSURE TESTS P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: NYWD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
								77.0			0.0 - 6.0 ft: See Hole CP24.	Complete borehole number is B3890CP24-2.	
												Samples between 0 - 6.0' were obtained from Hole CP24.	
SS	2.0	1.0						71.0			6.0 - 11.9 ft: FILL; Sandy SILT, (ML); Blackish red (CR2/2) changing to Grayish black (N2) at 8.0', with cement fragments, firm between 6.0 - 7.0', soft between 8.0 - 11.9', moist.	Hole advanced to depth by 3" OD sp spoon samplers.	
SS	2.0	1.2						69.0				Borehole sampled TMA/Eberline Co	
SS	2.5	1.9						67.0	10				
								65.1					
								64.5					
TOTAL DEPTH = 12.5 FT.											Borehole complete at 12.5'.	Borehole backfilled with cuttings and sand upon completion.	
											* Core recovery re to total soil & rock sample.	** Number of chemical samples to lab.	
											Ground elevation estimated from sit topographic map.	Description & classification by visual examination sample.	
											Colors from *Rock-Color Cha (GSA, 1948).		

Bechtel GEOLOGIC DRILL LOG										PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 of 1	MOLE NO. CP25
SITE Maywood Inter. Storage Pile			COORDINATES N 9846.0; E 9600.0				ANGLE FROM HORIZ Vertical		BEARING -----					
BEGUN 10-11-90	COMPLETED 10-11-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Crane and hammer		SIZE 3"	OVERBURDEN 4.0	ROCK (FT.) 0.0	TOTAL DEPTH 4.0					
CORE RECOVERY (FT./%) 2.7/68*		CORE BOXES 0	SAMPLES 2**	ELEV. TOP CASING NA	GROUND EL. 66.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA						
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN MOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel									
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. IN" CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET		
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.								
SS	2.0	1.4					66.0				0.0 - 3.3 ft: FILL. 0.0 - 1.4 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), slighty moist.	Complete borehole number is B3890CP25.		
SS	2.0	1.3					64.6 64.0 62.7 62.0				2.0 - 3.3 ft: Gravelly, Sandy SILT, (ML); Blackish red (6R2/2), moist.	Borehole sampled TMA/Eberline Co Hole advanced to depth by 3" OD spoon samplers.		
TOTAL DEPTH = 4.0 FT.											Borehole complet at 4.0'. Borehole backfill with cuttings and sand upon completion.			

* Core recovery 1 to total soil & rock sample.

** Number of chemical samples to lab.

Ground elevation estimated from a topographic map

Description & classification by visual examination of sample.

Colors from "Rock-Color Ch (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP2		
SITE Maywood Inter. Storage Pile			COORDINATES N 9754.0; E 9545.0				ANGLE FROM HORIZ Vertical		BEARING ----		
BEGUN 10-11-90	COMPLETED 10-11-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 6.0	ROCK (FT.) 0.0	TOTAL D 6.0		
CORE RECOVERY (FT./%) 4.3/72*		CORE BOXES 0	SAMPLES 4**	EL. TOP CASING NA	GROUND EL. 66.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel					
SAMP TYPE AND DIAH.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LEN CORE REC.	LOSS IN G.P.M	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SCALE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL RETURN CHARACTER OF DRILLING, E
					PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.6					66.0			(Template: NYLD)	
							64.4			0.0 - 1.5 ft: FILL	Complete borehole number is B3890CP26. Hole advanced by driving 3" OD sp spoon samplers. Borehole sample: TMA/Eberline C
SS	2.0	1.2					64.0			0.0 - 3.2 ft: Gravelly, Silty SAND, (GM); Moderate reddish brown (10R4/6).	
							62.8				
							62.0				
SS	2.0	1.8					60.5			4.0 - 5.5 ft: Gravelly, Sandy SILT; Blackish red (5R2/2), moist.	
							60.0				
										TOTAL DEPTH = 6.0 FT.	Borehole comple at 6.0'. Borehole backfill with cuttings an sand upon completion.
										* Core recovery to total soil & r sample.	
										** Number of chemical sample to lab.	
										Ground elevatio estimated from topographic ma	
										Description & classification by visual examinat sample.	
										Colors from "Rock-Color Ct (GSA, 1948).	

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP27	
SITE Maywood Inter. Storage Pile			COORDINATES N 9750.0; E 9600.0				ANGLE FROM HORIZ Vertical		BEARING -----	
BEGUN 9-26-90	COMPLETED 9-26-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 8.0	ROCK (FT.) 0.0	TOTAL DE 8.0	
CORE RECOVERY (FT./%) 5.9/74°		CORE BOXES 0	SAMPLES 4**	EL. TOP CASING NA	GROUND EL. 77.5	DEPTH/EL. GROUND WATER / NA / NA		DEPTH/EL. TOP OF ROCK NA/NA		
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: R. Cook				
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	BLOWS IN 1" CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN CHARACTER OF DRILLING, ET
				LOSS IN G.P.M.	PRESS. P.S.I.						TIME MIN.
SS	2.0	1.6				77.5			0.0 - 7.5 ft: FILL.	Complete borehole number is B3890CP27. Hole advanced by driving 3" OD spl spoon samplers. Borehole sampled TMA/Eberline C
						75.9			0.0 - 1.6 ft: Silty SAND, (SM); Moderate brown (5YR3/4), sand -80%, silt -30%, gravel >10%, dry to moist.	
SS	2.0	1.7				75.5			2.0 - 3.7 ft: Color change to Olive black (5Y2/1), red bed cobbles 2" diameter, trace amounts of concrete, gravel -10-20%, moist.	
SS	2.0	1.1				73.8 73.5			4.0 - 5.1 ft: Same as above, gravel >10%, moist.	
SS	2.0	1.6				72.4 71.5			6.0 - 7.5 ft: Same as above, dry, red bed cobble 2" diameter, coarse grained.	
						70.0 69.5			TOTAL DEPTH = 8.0 FT.	Borehole complet at 8.0'. Borehole backfill with cuttings and sand upon completion.

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE
 - - - - - OTHER

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO. CP27

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP2			
SITE Maywood Inter. Storage Pile			COORDINATES N 9750.0; E 9650.0				ANGLE FROM HORIZ. Vertical	BEARING -----				
BEGUN 9-25-90	COMPLETED 9-25-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 2.0	ROCK (FT.) 0.0	TOTAL DI 2.0			
CORE RECOVERY (FT./%) 1.4/70*		CORE BOXES 0	SAMPLES 0**	EL. TOP CASING NA	GROUND EL. 77.5	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: R. Cook						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. IN. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SIDEPI	DESCRIPTION AND CLASSIFICATION (Template: MYWD)	NOTES ON: WATER LEVEL; WATER RETURN; CHARACTER OF DRILLING, E
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4						77.5			0.0 - 1.4 ft: FILL. 0.0 - 0.8 ft: Moderate Brown (5YR3/4). 0.8 - 1.1 ft: Concrete. 1.1 - 1.4 ft: Gravelly SAND and SILT, (GM); Grayish brown (5YR3/2), sand -30%, silt -30%, clay -20%, gravel -20%, moist.	Complete borehole number is B3890CP28. Hole advanced by driving 3" OD sp spoon samplers. Spoon refusal at Borehole backfill with cuttings and sand upon completion.
								76.1				
								75.5				
TOTAL DEPTH = 2.0 FT.												

* Core recovery to total soil & rc sample.

** Number of chemical sample to lab.

Ground elevatio estimated from topographic map

Description & classification by visual examination of sample.

Colors from "Rock-Color Ch (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP28		
SITE Maywood Inter. Storage Pile			COORDINATES N 9753.0; E 9653.0				ANGLE FROM NORTH BEARING Vertical -----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL D		
9-25-90	9-25-90	Hydro Group, Inc.		Tripod		3"	14.0	0.0	14.		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.8/57*		0	5**	NA	77.5	2 / NA 3 / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN MOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			R. Cook					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. L.F. RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E
					PRESS. P.S.I.	TIME MIN.					
							77.5			(Template: MYLD)	
							75.5			0.0 - 2.0 ft: See Hole CP-28.	Complete borehole number is B3890CP28-1.
SS	2.0	1.5					74.0			2.0 - 3.0 ft: FILL.	Hole advanced by driving 3" OD spoon samplers.
							73.5			3.0 - 3.5 ft: Silty SAND, (SM); Olive black (5Y2/1), sand -60%, silt -35%, gravel -5%.	Borehole sample TMA/Eberline
SS	2.0	0.8					72.7	5		4.0 - 4.8 ft: Composition same as above, matrix is Pale brown (5YR5/2), with cobbles, Dark reddish brown (10R3/4), up to 2.5" diameter.	Cobble wedged bottom of samp 4.8 ft.
							71.5			6.0 - 13.6 ft: Same as above, color change to Olive black (5Y2/1), granitic cobble, 2" diameter, in bottom of run at 7.7'.	
							69.8				
							69.5				
SS	2.0	0.8					68.7				
							67.5				
SS	1.0	0.6					66.9	10			
							66.5				
SS	2.0	0.8					65.7				Borehole compl at 14.0'.
							64.5				Borehole backfill with cuttings at sand upon completion.
SS	1.0	0.6					63.9				
							63.5				
TOTAL DEPTH = 14.0 FT.											
<p>* Core recovery to total soil & 1 sample.</p> <p>** Number of chemical sampls to lab.</p> <p>Ground elevati estimated from topographic m</p> <p>Description & classification b visual examine sample.</p> <p>Colors from *Rock-Color C (GSA, 1948).</p>											

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 of 1	MOLE NO. CP29		
SITE Maywood Inter. Storage Pile				COORDINATES N 9750.0; E 9700.0			ANGLE FROM HORIZ BEARING Vertical				
BEGUN 10-5-90	COMPLETED 10-5-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Crane and hammer	SIZE 3"	OVERBURDEN 4.0	ROCK (FT.) 0.0	TOTAL DEPTH 4.0			
CORE RECOVERY (FT./%) 2.8/70*		CORE BOXES 0	SAMPLES 2**	EL. TOP CASING NA	GROUND EL. 61.0	DEPTH/EL. GROUND WATER NA/NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Don Downing					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BL. IN IN. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	2.0					61.0			0.0 - 2.8 ft: FILL.	Complete borehole number is B3890CP29.
SS	2.0	0.8					58.2				Borehole sampled TMA/Eberline Co
							57.0				Hole advanced to depth by 3" OD spoon samplers.
										TOTAL DEPTH = 4.0 FT.	Hole abandoned at 4.0' because of insufficient recovery.
											Borehole backfilled with cuttings and sand upon completion.

(Template: MYLD)

* Core recovery % to total soil & rock sample.

** Number of chemical samples to lab.

Ground elevation estimated from topographic map

Description & classification by visual examination of sample.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 of 1	HOLE NO. CP29
SITE Maywood Inter. Storage Pile			COORDINATES N 9741.0; E 9707.0				ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 10-5-90	COMPLETED 10-5-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Crane and hammer		SIZE 3"	OVERBURDEN 4.0	ROCK (FT.) 0.0	TOTAL D 4.0
CORE RECOVERY (FT./%) 1.3/65*		CORE BOXES 0	SAMPLES 1**	EL. TOP CASING NA	GROUND EL. 61.0	DEPTH/EL. GROUND WATER / NA		DEPTH/EL. TOP OF ROCK NA/NA	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Don Downing			
SAMP TYPE AND DIAM. SAMP. ADV. LEN. CORE SAMPLE REC. CORE REC. SAMPLE IN. BL. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS PRESS. P.S.I. TIME IN MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: NYWD)			NOTES ON: WATER LEVEL: WATER RETURN CHARACTER OF DRILLING, E
						DESCRIPTION AND CLASSIFICATION			
						0.0 - 2.0 ft: See Hole CP29.			
						2.0 - 3.3 ft: FILL.			
SS	2.0	1.3	61.0			TOTAL DEPTH = 4.0 FT.			Borehole sample: TMA/Eberline C
			59.0						Borehole comple at 4.0'.
			57.7						Borehole backfill with cuttings and sand upon completion.
			57.0						

* Core recovery to total soil & n sample.

** Number of chemical sample to lab.

Ground elevatic estimated from topographic ma

Description & classification by visual examinast sample.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 of 1	HOLE NO. CP30			
SITE Maywood Inter. Storage Pile			COORDINATES N 9710.0; E 9585.0				ANGLE FROM HORIZ BEARING Vertical					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEP			
10-3-90	10-3-90	Hydro Group, Inc.		Tripod		3"	7.0	0.0	7.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.3/47*		0	3**	NA	75.0	/ NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knüttel						
SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE N°	CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
						PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.6						73.0			0.0 - 4.3 ft: FILL; SAND, (SW); Moderate reddish brown (10R4/6), with gravel and silt, slightly moist. Complete borehole number is B3890CP30. Borehole sampled by TMA/Eberline Cor Hole advanced to depth by 3" OD sp spoon samplers. Spoon driven from - 7.0' because of vt in fill material between - 5 - 6'. TOTAL DEPTH = 7.0 FT. Hole abandoned at 7.0' because of insufficient recover Borehole backfilled with cuttings and sand upon completion.	
								73.5				
SS	2.0	1.6						73.0				
								71.5				
SS	3.0	0.3						71.0				
								70.7				
								68.0				

* Core recovery re to total soil & rock sample.

** Number of chemical samples to lab.

Ground elevation estimated from site topographic map.

Description & classification by visual examination sample.

Colors from *Rock-Color Chart (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP30-			
SITE Maywood Inter. Storage Pile				COORDINATES N 9713.0; E 9585.0			ANGLE FROM HORIZ BEARING Vertical -----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEP			
10-3-90	10-3-90	Hydro Group, Inc.		Tripod		3"	9.1	0.0	9.1			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.7/73*		0	3**	NA	75.0	V / NA W / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			NONE			Stephen Knüttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	BL. SAMPLE IN. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN CHARACTER OF DRILLING, ETI
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
							75.0				(Template: MYWD)	
											0.0 - 4.0 ft: See Hole CP30.	Complete borehole number is B3890CP30-1.
											4.0 - 8.9 ft: FILL; Sandy SILT, (ML); Blackish red (SR2/2), moist.	Samples between 1 - 4.0' were obtained from Hole CP30.
							71.0					Chisel driven to 2' to move obstruction.
							69.6					Hole advanced to depth by 3" OD spoon samplers.
							69.0					Borehole sampled TMA/Eberline Co
							67.6					
							67.0					
							66.1					
							65.9					Spoon refusal at 1'
											TOTAL DEPTH = 9.1 FT.	Chisel bent moving previous obstruction hole abandoned.
												Borehole backfilled with cuttings and sand upon completion.
												* Core recovery 1 to total soil & rock sample.
												** Number of chemical samples to lab.
												Ground elevation estimated from topographic map
												Description & classification by visual examination of sample.
												Colors from "Rock-Color Ch (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP30-		
SITE Maywood Inter. Storage Pile			COORDINATES N 9708.0; E 9586.0				ANGLE FROM HORIZ Vertical		BEARING -----		
BEGUN 10-4-90	COMPLETED 10-4-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 3.2	ROCK (FT.) 0.0	TOTAL DEP 3.2		
CORE RECOVERY (FT./%) 0.0/0*		CORE BOXES 0	SAMPLES 0**	EL. TOP CASING NA	GROUND EL. 75.0	DEPTH/EL. GROUND WATER 2 / NA 4 / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE "IN" CORE RECOVERY	LOSS IN G.P.M.	LATER PRESSURE P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
							75.0			0.0 - 3.2 ft: Soils not described, see Hole CP30.	Complete borehole number is B3890CP30-2. Samples between 0 - 4.0' were obtained from Hole CP30.
							71.8			TOTAL DEPTH = 3.2 FT.	Hole advanced to depth by 3" OD sp spoon samplers. Spoon refusal at 3. hole abandoned. Borehole backfilled with cuttings and sand upon completion.

* Core recovery re to total soil & rock sample.

** Number of chemical samples to lab.

Ground elevation estimated from site topographic map.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP30-			
SITE Maywood Inter. Storage Pile			COORDINATES N 9706.0; E 9586.0				ANGLE FROM HORIZ BEARING Vertical		-----			
BEGUN 10-4-90	COMPLETED 10-4-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3"	OVERBURDEN 13.1	ROCK (FT.) 0.0	TOTAL DEPTH 13.1					
CORE RECOVERY (FT./%) 2.4/60*		CORE BOXES 0	SAMPLES 2**	EL. TOP CASING NA	GROUND EL. 75.0	DEPTH/EL. GROUND WATER 7 / NA	DEPTH/EL. TOP OF ROCK NA/NA					
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMP. LEN. IN* % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
							75.0				(Template: NYMO)	
											0.0 - 4.0 ft: See Hole CP30.	Complete borehole number is B3890CP30-3.
											4.0 - 9.0 ft: See Hole CP30-1.	Samples between 0 - 4.0' were obtained from Hole CP30. Samples between 4 - 9.1' were obtained from Hole CP30-1
							66.0				9.0 - 12.1 ft: FILL; Sandy SILT, (ML); Blackish red (5R2/2), moist.	Hole advanced to depth by 3" OD sp spoon samplers. Borehole sampled TMA/Eberline Co
							64.7	10				Spoon refusal at 1
							64.0					0 = Chisel driven 11.0' to move obstruction.
							62.9					Spoon refusal at 1 borehole complete
							61.9					
											TOTAL DEPTH = 13.1 FT.	Borehole backfilled with cuttings and sand upon completion.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP3		
SITE Maywood Inter. Storage Pile			COORDINATES N 9700.0; E 9600.0				ANGLE FROM HORIZ Vertical		BEARING -----		
BEGUN 9-21-90	COMPLETED 9-21-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 4.0	ROCK (FT.) 0.0	TOTAL DI 4.0		
CORE RECOVERY (FT./%) 2.4/60*		CORE BOXES 0	SAMPLES 0**	SEL. TOP CASING NA	GROUND EL. 76.0	DEPTH/EL. GROUND WATER / NA / NA		DEPTH/EL. TOP OF ROCK NA/NA			
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: R. Cook					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOCKS IN CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYWD)	NOTES ON: WATER LEVEL! WATER RETURN! CHARACTER OF DRILLING, E'
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.6					76.0			0.0 - 2.8 ft: FILL. 0.0 - 1.6 ft: Silty SAND, (SM): Moderate brown (5YR3/4), sand -60 - 70%, silt -20 - 30%, gravel -5 - 10%, up to 2" cobbles, moist. 1.5 ft. Color change to Olive black (5Y2/1). 2.0 - 2.8 ft: Same as above, moisture level decreasing with depth.	Complete borehole number is B3890CP31. Hole advanced by driving 3" OD sp spoon samplers. Hole abandoned 4.0' because of insufficient recovery.
SS	2.0	0.8					74.4 74.0 73.2 72.0			TOTAL DEPTH = 4.0 FT.	Borehole backfill with cuttings and sand upon completion.

* Core recovery to total soil & 1 sample.
 ** Number of chemical samples to lab.
 Ground elevations estimated from topographic map.
 Description & classification by visual examination of sample.
 Colors from "Rock-Color Chart" (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP31-		
SITE Maywood Inter. Storage Pile			COORDINATES N 9693.0; E 9607.0				ANGLE FROM HORIZ Vertical		BEARING -----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEP		
9-21-90	9-21-90	Hydro Group, Inc.		Tripod		3"	0.5	0.0	0.5		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
0.0/0*		0	0**	NA	76.0	/ NA / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			R. Cook					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LEN. BLOWS IN % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYMD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
					PRESS. P.S.I.	TIME MIN.					
SS	0.5	0.0					76.0 75.5			0.0 - 0.5 ft: See Hole CP31. TOTAL DEPTH = 0.5 FT.	Complete borehole number is B3890CP31-1. Samples between 0 - 2.0' obtained from Hole CP31. Spoon refusal at 0.1' Borehole backfilled with cuttings and sand upon completion.

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO. CP31-1

* Core recovery re: to total soil & rock sample.

** Number of chemical samples to lab.

Ground elevation estimated from site topographic map.

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP31-		
SITE Maywood Inter. Storage Pile			COORDINATES N 9700.0; E 9606.0			ANGLE FROM HORIZ BEARING Vertical -----				
BEGUN 9-21-90	COMPLETED 9-21-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3"	OVERBURDEN 13.0	ROCK (FT.) 0.0	TOTAL DEPTH 13.0			
CORE RECOVERY (FT./%) 7.2/55°		CORE BOXES 0	SAMPLES 3**	EL. TOP CASING NA	GROUND EL. 76.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA		
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: R. Cook					
SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	BLOWS IN Z CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
				LOSS IN G.P.H.	PRESS. P.S.I.						TIME MIN.
SS	2.0	1.8				76.0			0.0 - 11.7 ft: FILL. 0.0 - 2.0 ft: See Hole CP31.	Complete borehole number is B3890CP31-2.
SS	2.0	1.4				74.0			2.0 - 3.4 ft: Silty SAND (SM); Olive black (S _{Y2} /1), sand -60 - 70%, silt -20 - 30%, gravel -5 - 10%, up to 2" cobbles, moisture level decreasing with depth.	Hole advanced by driving 3" OD spl spoon samplers.
SS	2.0	1.2				72.1			4.0 - 5.2 ft: Same as above, material increases in grain size, gravel -20 - 30%, sand -40 - 60%, moist.	Borehole sampled TMA/Eberline Ct
SS	2.0	1.1				70.8	5		6.0 - 7.1 ft: Same as above, cobbles up to 2-3" diameter, moist.	
SS	2.0	0.8				68.9			8.0 - 8.5 ft: Sand -50 - 60%, gravel -5 - 15%, moist.	
SS	2.0	0.6				68.0				
SS	1.4	0.9				67.5			10.0 - 10.85 ft: Same as above, moist, 3" diameter sandstone cobble.	
SS	1.6	0.3				66.0	10		11.4 - 11.7 ft: Sand -60 - 70%, gravel <10%, decreasing moisture content.	Spoon refusal at Chisel used to br obstruction.
						65.2				
						64.6				
						64.3				
						63.0				
TOTAL DEPTH = 13.0 FT.									Spoon refusal at borehole complet	
									Borehole backfill with cuttings and sand upon completion.	
									* Core recovery : to total soil & re sample.	
									** Number of chemical sample to lab.	
									Ground elevatio estimated from s topographic map	
									Description & classification by visual examinatio sample.	
									Colors from "Rock-Color Ch (GSA, 1948).	

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE

Maywood Inter. Storage Pile

Last Update: 06-10-91

HOLE NO. CP31-

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP32	
SITE Maywood Inter. Storage Pile				COORDINATES N 9700.0; E 9650.0			ANGLE FROM HORIZ BEARING Vertical -----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DE	
9-24-90	9-24-90	Hydro Group, Inc.		Tripod		3"	2.0	0.0	2.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
1.6/80*		0	1**	NA	76.5	7 / NA 4 / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in			none			Stephen Knüttel				
SAMP TYPE SAMP. DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. N° BLOBS IN CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: NYLD)	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
				LOSS G.P.M.	TIME MIN.					
SS	2.0	1.6				76.5			0.0 - 1.6 ft: FILL. 0.0 - 1.4 ft: Silty SAND, (SM); Moderate brown (5YR3/4). 1.4 - 1.6 ft: Asphalt.	Complete borehole number is B3890CP32.
						74.9 74.5			TOTAL DEPTH = 2.0 FT.	Borehole sampled TMA/Eberline Co Hole advanced to depth by 3" OD spoon samplers. Spoon refusal at 2 hole abandoned. Borehole backfill with cuttings and sand upon completion.

SS = SPLIT SPOON; ST = SHELBY TUBE; SITE
D = DENNISON; P = PITCHER; O = OTHER

Maywood Inter. Storage Pile Last Update: 06-10-91 HOLE NO. CP32

* Core recovery r to total soil & roc sample.
** Number of chemical samples to lab.
Ground elevation estimated from soil topographic map.
Description & classification by visual examinatio sample.
Colors from *Rock-Color Cha (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP32-	
SITE Maywood Inter. Storage Pile			COORDINATES N 9694.0; E 9650.0				ANGLE FROM HORIZ BEARING Vertical -----			
BEGUN 9-24-90	COMPLETED 9-24-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 3.7	ROCK (FT.) 0.0	TOTAL DEP 3.7	
CORE RECOVERY (FT./%) 1.1/65*		CORE BOXES 0	SAMPLES 1**	EL. TOP CASING NA	GROUND EL. 76.5	DEPTH/EL. GROUND WATER 7 / NA 3 / NA		DEPTH/EL. TOP OF ROCK NA/NA		
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knüttel				
SAMP DIAM.	SAMP ADV. LEN CORE	SAMP REC. CORE REC.	SAMP L.N. CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYLD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
				LOSS G.P.M.	PRESS. P.S.I.						TIME MIN.
						76.5			0.0 - 2.0 ft: See Hole CP32.	Complete borehole number is B3890CP32-1.
SS	1.7	1.1				74.5			2.0 - 3.1 ft: FILL; Silty SAND, (SM); Brownish black (SYR2/1), with gravel.	Samples between 0 2.0' were obtained from Hole CP32.
						73.4				Hole advanced to depth by 3" OD sp spoon samplers.
						72.8			TOTAL DEPTH = 3.7 FT.	Borehole sampled TMA/Eberline Co Spoon refusal at 3 hole abandoned. Borehole backfill with cuttings and sand upon completion.

* Core recovery % to total soil & rock sample.
** Number of chemical samples to lab.
Ground elevation estimated from a topographic map
Description & classification by visual examination of sample.
Colors from "Rock-Color Ch (GSA, 1948).

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE Maywood Inter. Storage Pile Last Update: 06-10-91 HOLE NO. CP32-

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP32-		
SITE Maywood Inter. Storage Pile				COORDINATES N 9700.0; E 9656.0				ANGLE FROM HORIZ. BEARING Vertical			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEP.			
9-24-90	9-24-90	Hydro Group, Inc.	Tripod		3"	13.4	0.0	13.4			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.8/72°		0	3**	NA	76.5	/ NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knüttel					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. IN. BL. LOSS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ET
					LOSS IN. G.P.M.	PRESS. P.S.F. TIME MIN.					
							78.5			0.0 - 2.0 ft: See Hole CP32.	Complete borehole number is B3890CP32-2.
										2.0 - 4.0 ft: See Hole CP32-1.	Samples between 1 - 2.0' were obtained from Hole CP32.
							72.5			4.0 - 13.3 ft: FILL 4.0 - 5.9 ft: Sandy GRAVEL, (GW); Dusky yellowish brown (10YR2/2).	Samples between 1 - 4.0' were obtained from Hole CP32-1
SS	2.0	1.9					70.6 70.5	5		6.0 - 10.6 ft: Sandy SILT, (ML); Brownish black (5YR2/1), with gravel.	Hole advanced to depth by 3" OD spoon samplers.
SS	2.0	1.6					68.9 68.5				Borehole sampled TMA/Eberline Co
SS	2.0	1.4					67.1 66.5				
SS	2.0	0.6					65.9	10			
SS	1.4	1.3					64.5			12.0 - 13.3 ft: Sandy GRAVEL, (GW); Grayish olive green (5GY3/2).	
							63.2 63.1			TOTAL DEPTH = 13.4 FT.	Spoon refusal at borehole completion. Borehole backfill with cuttings and sand upon completion.
* Core recovery 1 to total soil & rock sample. ** Number of chemical samples to lab. Ground elevation estimated from a topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Ch (GSA, 1948).											
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER										SITE Maywood Inter. Storage Pile Last Update: 06-10-91	HOLE NO. CP32-

Bechtel GEOLOGIC DRILL LOG		PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	MOLE NO. CP3										
SITE Maywood Inter. Storage Pile		COORDINATES N 9700.0; E 9708.0			ANGLE FROM HORIZ. BEARING Vertical		-----										
BEGUN 10-5-90	COMPLETED 10-5-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Crane and hammer	SIZE 3"	OVERBURDEN 4.0	ROCK (FT.) 0.0	TOTAL DI 4.0									
CORE RECOVERY (FT./%) 2.6/65*		CORE BOXES 0	SAMPLES 2**	EL. TOP CASING NA	GROUND EL. 61.0	DEPTH/EL. GROUND WATER NA/NA		DEPTH/EL. TOP OF ROCK NA/NA									
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Don Downing												
SAMP. TYPE AND DIAM.		SAMP. ADV. LEN. CORE		SAMP. REC. CORE REC.		SAMP. IN" BL. SOILS		CORE RECOVERY		WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: NYMD)	NOTES ON: WATER LEVEL, WATER RETURN, CHARACTER OF DRILLING, E	
LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.															
SS	2.0	1.6										61.0			0.0 - 3.1 ft. FILL	Complete borehole number is B3890CP33.	
												59.5					
												59.0					
SS	2.0	1.1										57.9				Hole advanced to depth by 3" OD spoon samplers.	
												57.0					
															TOTAL DEPTH = 4.0 FT.		Borehole complete at 4.0'.
																	Borehole backfill with cuttings and sand upon completion.
																	* Core recovery to total soil & r sample.
																	** Number of chemical sample to lab.
																	Ground elevations estimated from topographic map.
																	Description & classification by visual examination of sample.

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE Maywood Inter. Storage Pile Last Update: 06-10-91 MOLE NO. CP33

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP3			
SITE Maywood Inter. Storage Pile				COORDINATES N 9660.0; E 9600.0				ANGLE FROM HORIZ. BEARING Vertical				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL I				
10-10-90	10-10-90	Hydro Group, Inc.	Crane and hammer		3"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.6/83%		0	6**	NA	66.0	7 / NA 8 / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knüttel						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. IN % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVEL WATER RETURN CHARACTER OF DRILLING, E
				LOSS IN G.P.H.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.2					66.0				0.0 - 7.6 ft: FILL. 0.0 - 1.2 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), slightly moist.	Complete borehole number is B3890CP34.
SS	2.0	1.9					64.8 64.0				2.0 - 3.9 ft: Gravelly, Silty SAND, (SM); Grayish black (N2), changing to Gravelly SILT, (ML); Dark reddish brown (10R3/4), moist.	Borehole sample TMA/Eberline (
SS	2.0	1.9					62.1 62.0				4.0 - 5.9 ft: SAND, (SW); Moderate reddish brown (10R4/6), with gravel.	Hole advanced 1 depth by 3" OD spoon samplers.
SS	2.0	1.6					60.1 60.0				6.0 - 7.6 ft: Sandy SILT, (ML); Blackish red (5R2/2).	
							58.4 58.0				TOTAL DEPTH = 8.0 FT.	Borehole compl at 8.0'. Borehole backfill with cuttings at sand upon completion.
<p>* Core recovery to total soil & 1 sample.</p> <p>** Number of chemical sampl to lab.</p> <p>Ground elevati estimated from topographic m</p> <p>Description & classification b visual examina sample.</p> <p>Colors from *Rock-Color C (GSA, 1948).</p>												

SS = SPLIT SPOON; ST = SHELBY TUBE;
D = DENNISON; P = PITCHER; O = OTHER

SITE Maywood Inter. Storage Pile
Last Update: 06-10-91

HOLE NO. CP34

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP35			
SITE Maywood Inter. Storage Pile			COORDINATES N 9665.0; E 9650.0				ANGLE FROM HORIZ BEARING Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEP			
9-24-90	9-24-90	Hydro Group, Inc.		Tripod		3"	6.0	0.0	6.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
2.7/45*		0	1**	NA	75.0	▽ / MA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knuttel						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. IN" BL. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYMD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.0				75.0				0.0 - 4.6 ft: FILL. 0.0 - 0.3 ft: Grayish red (10R4/2). 0.3 - 0.6 ft: Red brick. 0.6 - 1.0 ft: Asphalt.	Complete borehole number is B3890CP35.	
SS	2.0	1.1				74.0				2.0 - 4.6 ft: Gravelly, Silty SAND, (GM); Dark reddish brown (10R3/4).	Hole advanced by driving 3" OD split spoon samplers.	
SS	2.0	0.6				73.0					Borehole sampled TMA/Eberline Co	
						71.9						
						71.0						
						70.4					Rock stuck in core cutter at 4.6 ft.	
						69.0					Hole abandoned at 6.0' because of insufficient recovery.	
										TOTAL DEPTH = 6.0 FT.	Borehole backfilled with cuttings and sand upon completion.	

* Core recovery n to total soil & roc sample.
 ** Number of chemical samples to lab.
 Ground elevation estimated from st topographic map.
 Description & classification by visual examinatic sample.
 Colors from "Rock-Color Ch (GSA, 1948).

SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER

SITE: Maywood Inter. Storage Pile
 Last Update: 06-10-91
 HOLE NO. CP35

Bechtel GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.											
				FUSRAP	14501	1 OF 1	CP35-											
SITE			COORDINATES			ANGLE FROM HORIZ/BEARING												
Maywood Inter. Storage Pile			N 9665.0; E 9658.0			Vertical -----												
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DE										
9-24-90	9-24-90	Hydro Group, Inc.		Tripod	3"	13.2	0.0	13.2										
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK										
7.3/79*		0	3**	NA	75.0	NA / NA		NA/NA										
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:													
140 lbs/30 in		none			Stephen Knuttel													
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LEN" BL	SAMP. LEN" CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET					
						PRESS. P.S.I.	TIME MIN.											
								73.0					(Template: MTL0)					
												0.0 - 4.0 ft: See Hole CP-35.	Complete borehole number is B3890CP35-1.					
												4.0 - 13.0 ft: FILL. 4.0 - 6.0 ft: Gravally SAND, (SW); Brownish black (5Y2/1), moist in areas, compact.	Hole advanced by driving 3" OD split spoon samplers. Samples between 1 - 4.0' obtained from Hole CP35. Borehole sampled TMA/Eberline Co					
												7.0 - 10.6 ft: Silty SAND, Brownish black (5YR2/1), with gravel of Dark reddish brown (10R3/4) sandstone, moist.						
												11.0 - 13.0 ft: Sandy SILT; Olive black (5Y2/1), with gravel.						
												TOTAL DEPTH = 13.2 FT.	Spoon refusal at 1 borehole complete Borehole backfill with cuttings and sand upon completion.					
													* Core recovery r to total soil & rock sample. ** Number of chemical samples to lab. Ground elevation estimated from a topographic map Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).					
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER											SITE		Maywood Inter. Storage Pile		Last Update: 06-10-91		HOLE NO. CP35-1	

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP3				
SITE Maywood Inter. Storage Pile			COORDINATES N 9650.0; E 9701.0			ANGLE FROM HORIZONTAL BEARING Vertical -----						
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DE				
10-5-90	10-5-90	Hydro Group, Inc.		Crane and hammer	3"	4.0	0.0	4.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.6/90*		0	3**	NA	61.0	NA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP TYPE AND DIA.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	BLOWS IN % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.9					61.0				(Template: MYWD)	
SS	2.0	1.7					59.1 59.0				0.0 - 3.7 ft: FILL 0.0 - 1.9 ft: Silty SAND to Sandy SILT, (SM - ML); Blackish red (5R2/2).	Complete borehole number is B3890CP36.
							57.3 57.0				2.0 - 3.7 ft: Sandy SILT, (ML); Grayish black (N2), with gravel, moist.	Borehole sampled TMA/Eberline Co
TOTAL DEPTH = 4.0 FT.											Hole advanced to depth by 3" OD spoon samplers.	
											Borehole complet at 4.0'.	
											Borehole backfill with cuttings and sand upon completion.	

* Core recovery r to total soil & roc sample.

** Number of chemical samples to lab.

Ground elevation estimated from al topographic map.

Description & classification by visual examinatic sample.

Colors from "Rock-Color Cha (GSA, 1948).

Bechtel GEOLOGIC DRILL LOG				PROJECT FUSRAP			JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. CP37	
SITE Maywood Inter. Storage Pile			COORDINATES N 9630.0; E 9650.0				ANGLE FROM HORIZ Vertical		BEARING -----	
BEGUN 9-24-90	COMPLETED 9-24-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3"	OVERBURDEN 12.2	ROCK (FT.) 0.0	TOTAL DEPTH 12.2	
CORE RECOVERY (FT./%) 8.8/72*		CORE BOXES 0	SAMPLES 4**	EL. TOP CASING NA	GROUND EL. 71.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA		
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN MOLE: DIA./LENGTH none			LOGGED BY: R. Cook					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LEN. CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS WATER RETURN CHARACTER OF DRILLING, ET
				LOSS IN G.P.M.	PRESS. P.S.I.						TIME IN MIN.
SS	2.0	1.6				71.0			(Template: MYLD)	
						69.4			0.0 - 12.1 ft: FILL. 0.0 - 5.8 ft: Silty, Sandy GRAVEL (GM); Moderate brown (5YR3/4) to Brownish black (5YR2/1). 6.0 - 6.6 ft: Same as above, color change to Grayish brown (5YR3/2), sand -50%, silt -30%, gravel -20%, moist. 6.6 - 10.0 ft. Same as above, color change to Olive black (5Y2/1), sand -45%, gravel -30%. 10.0 - 12.1 ft: Same as above, with 2.5" diameter sandstone cobble, medium to coarse grain.	Complete borehole number is B3890CP37. Hole advanced by driving 3" OD split spoon samplers. Borehole sampled TMA/Eberline Co
SS	2.0	1.1				69.0				
						67.8				
SS	2.0	1.8				67.0				
						65.2	5			
SS	2.0	1.8				65.0				
						63.2				
SS	2.0	0.6				63.0				
						62.4				
SS	2.0	1.8				61.0	10			
						59.2				
						59.0				
SS	0.3	0.1				58.9				
						58.8				
TOTAL DEPTH = 12.2 FT.									Spoon refusal at borehole completion. Borehole backfill with cuttings and sand upon completion.	
SS = SPLIT SPOON; ST = SHELBY TUBE; D = DENNISON; P = PITCHER; O = OTHER										
SITE Maywood Inter. Storage Pile								Last Update: 06-10-91	HOLE NO. CP37	

Onsite Geologic Logs



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.				
SITE MISS on Site				COORDINATES N 9964.0; E 10246.0	FUSRAP	14501	1 OF 1 C001				
BEGUN 11-16-90	COMPLETED 11-16-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Soil Sentry	SIZE 8"	OVERBURDEN 4.0	ROCK (FT.) 7.3	TOTAL DEPTH 11.3				
CORE RECOVERY (FT./%) 8.7/77*	CORE BOXES 0	SAMPLES 6	EL. TOP CASING NA	GROUND EL. 63.0	DEPTH/EL. GROUND WATER NA / NA	DEPTH/EL. TOP OF ROCK 4.0/59.0					
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY %	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.F. TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: NYMD) DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	1.7	2 8 10 15			63.0			0.0 - 3.6 ft: FILL. 0.0 - 1.4 ft: Sandy Silt; Moderate brown (5YR3/4) changing to Dark reddish brown (10R3/4) at 0.6', fine grained, with roots, some sandstone gravel below 0.6', moist.	Complete borehole number is B3890C001.	
SS	2.0	1.6	30 31 11 8			61.3 61.0			1.4 - 2.3 ft: Gravelly Silt; Brownish black (5YR2/1), silt -70%, gravel -30%.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.1	4 3 3 6			59.4 59.0			2.3 - 3.6 ft: Gravel, coal and slag; Dark yellowish brown (10YR2/2), gravel -30%, coal -30%, slag -30%, silt -10%; fine to very coarse grained, no plasticity, moist.	Augered to 4.0'.	
SS	1.8	1.7	6 6 13 50/3"			57.9 57.0	5		4.0 - 11.3 ft: SANDSTONE and Sandy SILT, (ML); Dark reddish brown (10R3/4), silt -40%, clay -40%, sand -20%, sandstone -20%, fine grained to cobbles up to 1.5" in diameter; sandstone below 8.0', blocky, micaceous, with iron-oxide cement.	Augered to 6.0'.	
SS	1.3	1.3	30 31 50/4"			55.3 55.0				Spoon refusal at 7.8'	
						53.7				Augered to 8.0'.	
						53.0	10			Spoon refusal at 9.3'	
SS	1.3	1.3	nr nr 50/4"			51.7				Augered to 10.0'. Augered to 11.0'. Spoon refusal at 11.3'.	
TOTAL DEPTH = 11.3 FT.										3" PVC casing inserted to 11.0' for gamma-logging. PCV casing was removed after logging and hole was backfilled with grout and drilling spoils.	
										nr = not recorded. * Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		MISS on Site		Last Update: 03-31-92		HOLE NO. C001	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP		14501	1 OF 1	C001-1		
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
MISS on Site			N 9962.0; E 10246.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-16-90	11-16-90	Hydro Group, Inc.	Mobile B-80		8"	4.3	1.7	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
1.9/95%		0	1	NA	63.0	7 / none ATD 4 / NA		4.3/58.7		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>					
SAMP TYPE SAMP. DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.						TIME MIN.
						63.0			(Template: MYWD)	
									0.0 - 4.0 ft: See Hole C001.	Complete borehole number is B3890C001-1.
SS	2.0	1.9	2 4 5 9			59.0 58.7		5	4.0 - 4.3 ft: FILL; slag and gravel. 4.3 - 5.9 ft: Sandy SILT and SANDSTONE, (ML); Dark reddish brown (10R3/4).	Hole augered directly to 4' to resample 4 - 6' interval because of insufficient recovery in Hole C001. Borehole sampled by TMA/Eberline Corp.
						57.1 57.0			TOTAL DEPTH = 6.0 FT.	Borehole backfilled with drilling spoils.



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
MISS on Site				N 9960.0; E 10250.0		14501	1 OF 1	C001-2		
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
12-3-90		12-3-90		Hydro Group, Inc.		Soil Sentry	8"/3"	4.4	8.6	13.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
8.0/62*		0	8	NA	63.0	-8' ATD / NA		4.4/58.6		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS / CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.						TIME MIN.
SS	2.0	1.8	7 12 15 15			63.0			0.0 - 3.7 ft: FILL. 0.0 - 0.6 ft: Silty Sand; Moderate brown (5YR3/4). 0.6 - 1.5 ft: Gravelly, Silty Sand; Dark reddish brown (10R3/4), fine grained, poorly sorted, firm, moist.	Complete borehole number is B3890C001-2.
SS	2.0	1.7	10 17 14 20			61.2 61.0			1.3 - 3.7 ft: Slag; Grayish black (N2) changing to Blackish red (5R2/2) at 2.0', fine gravel size; mixed with above layer below 2.0'; loose, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.8	1.3	8 9 27 50/4"			59.3 59.0 58.6			4.0 - 4.4 ft: Silty SAND (SM); Moderate reddish brown (10R4/6), sand is medium grained, poorly sorted, firm, moist.	Augered to 4.0'.
						57.7	5		4.4 - 11.8 ft: Silty, Gravelly SAND to SANDSTONE, (GM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted, firm; sandstone is very hard, fresh below 7.1'; moist.	Spoon refusal at 5.8'.
SS	0.1	0.1	50/1"			57.0 56.9				Augered to 6.0'.
SS	0.1	0.0	50/1"			55.9				Spoon refusal at 6.1'.
NQ	1.9	1.0	na			54.9				Augered to 7.0'.
NQ	2.0	1.3	na			54.0				Spoon refusal at 7.1'.
						52.7	10			Rock cored to 9.0'.
						52.0				Rock cored to 11.0'.
						51.2				Rock cored to 13.0'.
						50.0				3" PVC casing inserted to 7.0' for gamma-logging (logging below 7' completed in open borehole).
TOTAL DEPTH = 13.0 FT.									PCV casing was removed after logging; hole was grouted to -9' below surface and remaining hole backfilled with drilling spoils.	
* Core recovery refers to total soil & rock sample.										
Ground elevation estimated from topographic map.										
Description & classification by visual examination of sample.										
Colors from "Rock-Color Chart" (GSA, 1948).										

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

MISS on Site

Last Update: 03-31-92

HOLE NO. C001-2



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP	14501	1 OF 1	C002			
SITE			COORDINATES			ANGLE FROM HORIZ BEARING				
MISS on Site			N 9982.0; E 10128.0			Vertical -----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-19-90	11-19-90	Hydro Group, Inc.	Soil Sentry	8"	12.0	0.0	12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
10.0/83°		0	6	NA	60.0	1 / none ATD 2 / NA	NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.8	2 12 15 18			60.0			(Template: MYLD)	
SS	2.0	1.1	6 12 25 18			58.2 58.0			0.0 - 5.7 ft: FILL. 0.0 - 2.8 ft: Clayey Silt; Moderate brown (5YR4/4), clay -30%, silt -70%, no plasticity, moist.	Complete borehole number is B3890C002. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	5 2 1 2			56.9 56.0	5		2.8 - 5.7 ft: Silty Clay; Very pale orange (10YR8/2), clay -60-75%, silt -25%; mixed with coal -15%, fine to very coarsed grained, between 2.8 - 4.2'; no plasticity.	Augered to 4.0'.
SS	2.0	1.6	4 2 3 3			54.3 54.0			6.0 - 8.3 ft: Gravelly CLAY, (CL); Pale yellowish brown (10YR6/2) changing to Grayish black (N2) at 6.8', very fine to very coarse grained, no plasticity.	Augered to 6.0'.
SS	2.0	2.0	1 1 2 18			52.4 52.0 51.7			8.3 - 10.6 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), sand -70%, silt -30%; very fine to fine grained with low plasticity between 8.3 - 9.2', medium to coarse grained with no plasticity below; moist.	Augered to 8.0'.
SS	2.0	1.8	1 4 2 22			49.4 48.2 48.0	10		10.6 - 11.8 ft: Clayey SILT, (ML); Moderate yellowish brown (10YR5/4), silt -70%, clay -30%, low plasticity, very moist.	Augered to 10.0'.
									TOTAL DEPTH = 12.0 FT.	Augered to total depth of 12.0' 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
MISS on Site										FUSRAP		14501	1 OF 1	C003
SITE					COORDINATES					ANGLE FROM HORIZ		BEARING		
					N 9878.0; E 10224.0					Vertical		-----		
BEGUN		COMPLETED		DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-16-90		11-16-90		Hydro Group, Inc.			Soil Sentry		8"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)			CORE BOXES	SAMPLES	EL. TOP CASING		GROUND EL.	DEPTH/EL. GROUND WATER			DEPTH/EL. TOP OF ROCK			
4.1/51*			0	3	NA		60.0	/ none ATD / NA			NA/NA			
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:						
140 lbs/30 in				none				Robert Cook <i>[Signature]</i>						
(Template: NYWD)														
SAMP TYPE	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	CORE RECOVERY	LOSS	WATER PRESSURE	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	1.6	2	5	19		60.0				0.0 - 4.6 ft: FILL.		Complete borehole number is B3890C003.	
SS	0.9	0.9	15	50/4"			58.4				0.0 - 2.9 ft: Sandy Silt; Moderate brown (5YR3/4) changing to Dark yellowish orange (10YR6/6) at 0.5' and to Dark reddish brown (10R3/4) at 0.8', fine to medium grained, silt -70%, sand -30%; roots present to 0.5'; 0.2' pebble, Very pale orange (10YR8/2), between 2.7 - 2.9'; moist.		Borehole sampled by TMA/Ebarline Corp.	
SS	2.0	1.6	10	6	5		57.1				4.0 - 4.6 ft: Gravelly Silt; Moderate brown (5YR3/4), with brick fragments.		Spoon refusal at 2.9'.	
SS	2.0	0.0	4	2	5		56.0				4.6 - 5.6 ft: Sandy SILT, (ML); Grayish brown (5YR3/2), silt -70%, sand -30%, very fine to fine grained, low plasticity, moist.		Augered to 4.0'.	
							55.4						Augered to 6.0'.	
							54.4						Hole abandoned at 8.0' because of insufficient recovery.	
							52.0						Borehole backfilled with drilling spoils.	
											TOTAL DEPTH = 8.0 FT.			
													* Core recovery refers to total soil & rock sample.	
													Ground elevation estimated from topographic map.	
													Description & classification by visual examination of sample.	
													Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE

MISS on Site

Last Update: 03-31-92

HOLE NO. C003



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
SITE										COORDINATES		ANGLE FROM HORIZ	BEARING	
MISS on Site										N 9876.0; E 10224.0		Vertical	-----	
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-16-90		11-16-90		Hydro Group, Inc.		Soil Sentry		8"	8.0	4.0	12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING		GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.0/67*		0	3	NA		60.0	/ none ATD / NA		8.0/52.0					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			Robert Cook								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
							60.0					0.0 - 6.0 ft: See Hole C003.	Complete borehole number is B3890C003-1. Hole augered directly to 6' to resample 6 - 8' interval because of insufficient recovery in Hole C003. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.3	16 13 7 11				54.0					6.0 - 7.3 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand -70%, silt -10%, clay -10%, sandstone pebbles and cobbles -10%, fine to medium grained, rounded to subangular, no plasticity, moist.		
SS	1.5	1.5	20 26 50/6"				52.7					8.0 - 11.2 ft: SANDSTONE, Dark reddish brown (10R3/4), fine to medium grained, blocky, iron-oxide cement.	Augered to 8.0'. Spoon refusal at 9.5'.	
							52.0							
							50.5							
SS	1.2	1.2	26 34 50/3"				50.0	10					Augered to 10.0'.	
							48.8						Spoon refusal at 11.2'.	
							48.0							
TOTAL DEPTH = 12.0 FT.											Augered to total depth of 12.0'. 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging and hole was backfilled with drilling spoils.			
											* Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).			



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE				COORDINATES	ANGLE FROM HORIZ		BEARING
MISS on Site				N 9877.0; E 10226.0	Vertical		-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
12-5-90	12-5-90	Hydro Group, Inc.	Soil Sentry	8"/3"	8.0	10.0	18.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK	
9.0/50*	0	9	NA	60.0	7' ATD / NA	8.0/52.0	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:			
140 lbs/30 in		none		Stephen Knuttel			
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE LOSS IN RECOVERY	WATER PRESSURE TESTS		ELEV.	
				G.P.M.	P.S.F.	TIME MIN.	DEPTH
							GRAPHICS SAMPLE
(Template: NYWD)							
DESCRIPTION AND CLASSIFICATION						NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	1.6	4 6 10 27				60.0
0.0 - 3.0 ft: FILL.							
0.0 - 0.9 ft: Silty Sand; Brownish black (5YR2/1) changing to Moderate brown (5YR4/4) at 0.7'; loose, with roots between 0.0 - 0.7'; fine sand, moderately sorted, firm, below; moist.							
SS	2.0	1.0	39 15 10 11				58.4 58.0 57.0
0.9 - 1.6 ft: Gravelly Sand; Grayish brown (5YR3/2), fine to medium grained, poorly sorted, with red brick fragments.							
2.0 - 2.7 ft: Slag; Grayish black (N2) to Black (N1), gravel size, loose, slightly moist.							
SS	2.0	1.4	2 2 3 4				56.0
2.7 - 3.0 ft: Sludge; White (N9), hard, fractured.							
4.0 - 6.7 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted, gravel is mixed composition, soft, moist to wet.							
SS	2.0	0.7	1 2 20 45				54.6 54.0 53.3
SS	0.8	0.6	40 50/3"				52.0 51.4
8.0 - 16.7 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted; gravel is fractured sandstone, angular; changing to Sandstone, blocky, at 13.7'; firm, wet.							
SS	0.9	0.3	39 50/5"				50.0 49.7
SS	0.7	0.4	45 50/2"				48.0 47.6
NQ	1.3	1.3	na				46.3
NQ	3.0	1.7	na				45.0 43.3 42.0
TOTAL DEPTH = 18.0 FT.							
						* Core recovery refers to total soil & rock sample.	
						Ground elevation estimated from topographic map.	
						Description & classification by visual examination of sample.	
						Colors from "Rock-Color Chart" (GSA, 1948).	



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.						
MISS on Site				FUSRAP	14501	1 OF 1	C004						
SITE			COORDINATES		ANGLE FROM HORIZ BEARING								
MISS on Site			N 9928.0; E 10022.0		Vertical -----								
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
11-20-90	11-26-90	Hydro Group, Inc.	Mobile B-80	8"	21.5	0.0	21.5						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK						
17.4/81*		0	11	NA	60.0	15' ATD / NA	NA/NA						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:									
140 lbs/30 in		none		R. Cook/J. Novick									
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOCKS CORE RECOVERY	LOSS	G.P.M.	WATER PRESSURE TESTS P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	5 5 8 18					60.0			0.0 - 7.1 ft: FILL. 0.0 - 0.6 ft: Sandy Silt; Moderate brown (5YR4/4), silt -80%, fine to medium sand -20%, with roots, no plasticity, moist. 0.6 - 5.0 ft: Cinders, Slag, Silt and Sand; Brownish black (5YR2/1), fine to very coarse grained, no plasticity, moist.	Complete borehole number is B3890C004. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.0	9 11 26 50					58.6 58.0 57.0			5.0 - 5.3 ft: Silty Sand; Pale yellowish orange (10YR8/6), sand -80%, silt -20%, hard, consolidated, moist. 5.3 - 6.5 ft: Sludge; Very light gray (N8) changing to Grayish orange (10YR7/4) at 5.6' and to Grayish black (N2) at 5.8', silty, very fine grained; gravelly below 5.6'; no plasticity, moist. 6.5 - 7.1 ft: Mixed Fill; Grayish black (N2), clay -40%, cinders and slag -30%, gravel -20%, sand -10%.	Augered to depth after each sample between 4.0 - 12.0'. Spoon refusal at 13.9'. Augered to 15.0'.	
SS	2.0	2.0	9 7 9 10					56.0	5		7.1 - 7.4 ft: Silty CLAY, (CL); Very pale orange (10YR8/2), clay -90%, silt -10%, very fine grained, medium plasticity, moist. 7.4 - 8.5 ft: Sandy SILT, (ML); Dusky brown (5YR2/2), silt -80%, sand -20%, very fine to fine grained, no plasticity, moist.	Drilling stopped on 11/20 at 15'; hole was gamma-logged and covered with casing remaining in hole. Casing removed and drilling continued on 11/26.	
SS	2.0	1.9	7 3 2 5					52.9 52.6 52.1 52.0 51.5			8.5 - 10.0 ft: Clayey SILT, (ML); Dark yellowish brown (10YR4/2) changing to Grayish red (10R4/2) at 9.8', silt -70%, clay -30%, very fine to fine grained, low plasticity, moist.	Spoon refusal at 16.5'.	
SS	2.0	2.0	7 11 22 21					50.0	10		10.0 - 17.1 ft: SAND, (SP-SW); Pale reddish brown (10R5/4) changing to Moderate brown (5YR4/4) at 12.0' and to Moderate yellowish brown (10YR5/4) at 15.0', fine to medium grained, grain size increases with depth, rounded to angular grains consisting of quartz, feldspar and minor mafics; well sorted between 10.0 - 13.6', poorly sorted with gravel up to 1" below; sand -90%, silt -10%, minor organics, no plasticity, moist, saturated below 15.0'.	Augered to 16.5'. Spoon refusal at 17.5'. Augered to 17.5'. Augered to 19.5'. Augered to total depth of 21.5'. 3" PVC casing inserted for gamma-logging.	
SS	2.0	1.6	4 14 19 25					48.4 48.0					PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	1.9	1.6	13 24 38 50/4"					46.4					
SS	1.5	1.3	4 25 50/6"					45.0	15				* Core recovery refers to total soil & rock sample.
SS	1.0	0.9	7 50/6"					43.7 43.5 42.9 42.6 42.5					Ground elevation estimated from topographic map.
SS	2.0	2.0	9 26 30 50					38.8 38.5	20				Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.7	27 39 40 22										
TOTAL DEPTH = 21.5 FT.													

SS = SPLIT SPOON; NO = CORE BARREL; SITE
 MX = HAND AUGER; O = OTHER

MISS on Site

Last Update: 03-31-92

HOLE NO. C004



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 1	C005			
SITE			COORDINATES			ANGLE FROM HORIZ. BEARING					
MISS on Site			N 9953.0; E 9798.0			Vertical -----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-28-90	11-28-90	Hydro Group, Inc.		Mobile B-80		8"	8.0	9.0	17.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
11.1/65%		0	9	NA	59.0	/ none ATD / NA		8.0/51.0			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			G. Pais					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	1.5	1.3	18 20 50/6"				59.0			(Template: MYWD)	
							57.7			0.0 - 6.4 ft: FILL.	Complete borehole number is B3890C005.
							57.0			0.0 - 0.5 ft: Gravel; Light olive gray (5Y5/2).	
SS	2.0	1.1	23 21 13 10				55.9			0.5 - 5.3 ft: Silty Sand; Dark reddish brown (10R3/4) changing to Very dusky red (10R2/2) at 4.0', fine to medium grained; trace gravel, content increases with depth; dense, firm.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 1.5'.
							55.0				Spoon refusal at 1.5'.
SS	2.0	1.8	12 4 1 4				53.2	5		5.3 - 6.4 ft: Sludge; Pinkish gray (5YR3/1) mottled with Medium gray (N5) and Light gray (N7), clayey, sticky, moist.	Augered to 2.0'.
							53.0				Augered to 4.0'.
							52.6				Augered to 6.0'.
SS	2.0	1.3	3 3 8 8				51.7			6.4 - 7.3 ft: Silty SAND, (SM); Black (N1) to Grayish black (N2), fine to medium grained, carbonaceous.	Augered to 8.0'.
							51.0				Augered to 10.0'.
SS	2.0	1.6	4 10 14 13				49.4			8.0 - 17.0 ft: SAND, (SM); Dark reddish brown (10R3/4), fine to medium grained, subangular, trace cobbles, blocky structure, consolidated in places, dense, firm.	Augered to 10.0'.
							49.0				Augered to 12.0'.
SS	2.0	1.1	9 12 13 10				47.9	10			Augered to 14.0'.
							47.0				Augered to 16.0'.
SS	2.0	1.1	9 11 17 22				45.9				Spoon refusal at 16.3'.
							45.0				Augered to total depth of 17.0'.
SS	2.0	1.5	9 15 21 25				43.5	15			3" PVC casing inserted for gamma-logging.
							43.0				PCV casing was removed after logging and hole was backfilled with drilling spoils.
SS	0.3	0.3	50/4"				42.7				
							42.0				
TOTAL DEPTH = 17.0 FT.											
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>											



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
SITE										COORDINATES		ANGLE FROM HORIZ	BEARING	
MISS on Site										N 9685.0; E 9565.0		Vertical	-----	
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-3-90		12-3-90		Hydro Group, Inc.		Mobile B-80		8"	18.0	0.0	18.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING		GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
9.6/53*		0	9	NA		56.0	7 / NA 4 / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			G. Pais <i>[Signature]</i>								
SAMP. TYPE	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
SS	2.0	1.9	4	33			56.0				0.0 - 10.2 ft: FILL.	Complete borehole number is B3890C006.		
							54.1				0.0 - 0.4 ft: Topsoil; Sandy Silt; Moderate brown (5YR3/4), slightly cohesive.	Borehole sampled and gamma-logged by TMA/Eberline Corp.		
SS	2.0	1.5	4	4			54.0				0.4 - 2.5 ft: Sandy Silt; Dusky yellowish brown (10YR2/2), trace clay and gravel, slightly plastic, moist.	Augered to 2.0'.		
							52.5				2.5 - 10.2 ft: Sludge and Slag; various colors, whites to grays, and reds; medium to coarse grained; minor sand, gravel, brick fragments and organics; some silt and charcoal; loose.	Augered to 4.0'.		
SS	2.0	0.8	19	10			52.0					Augered to 6.0'.		
							51.2	5				Augered to 8.0'.		
							50.0					Augered to 10.0'.		
SS	2.0	0.4	3	1			49.6					Augered to 12.0'.		
							48.0					Augered to 14.0'.		
							47.7					Augered to 16.0'.		
							46.0					Augered to 18.0'.		
SS	2.0	1.7	2	9			45.8	10			10.2 - 17.0 ft: Silty SAND, (SM); Olive gray to Grayish black (N2), fine to medium grained, subangular to subrounded grains, moderately well sorted, trace clay, moist to saturated.	2-10 ppm organics in breathing zone, 1000 ppm in hole; allowed hole to vent 15 minutes without decrease in concentration.		
							44.3					Drilling terminated at 18.0'.		
							44.0					3" PVC casing inserted for gamma-logging.		
							43.0					PCV casing was removed after logging and hole was backfilled with drilling spoils.		
SS	2.0	0.0	3	4			40.0	15						
							39.0							
							38.0				17.0 - 18.0 ft: SAND, (SP); Grayish brown, fine to medium grained, moderately well sorted, soft, saturated.			
											TOTAL DEPTH = 18.0 FT.	* Core recovery refers to total soil & rock sample.		
												Ground elevation estimated from topographic map.		
												Description & classification by visual examination of sample.		
												Colors from "Rock-Color Chart" (GSA, 1948).		



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	C006-1				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
MISS on Site			N 9685.0; E 9566.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
1-2-91	1-2-91	Hydro Group, Inc.		Soil Sentry	8"	6.0	0.0	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.0/50*		0	3	NA	56.0	7 / none ATD NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook							
SAMP. TYPE	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	1.4	4 3				56.0			0.0 - 4.5 ft: FILL; Gravelly, Sandy Silt mixed with slag and coal; Moderate brown (5YR3/4) changing to Dark yellowish brown (10YR2/2) at 2.0' and to Dark reddish brown (10R3/4) at 4.0'; with weathered, fine grained, sandstone fragments; Slag is Grayish black (N2), fine grained to cobble size (-25 mm); some concrete fragments; well graded, no plasticity, moist.	Complete borehole number is B3890C006-1. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 2.0'. Augered to 4.0'.	
SS	2.0	1.1	9 16 10 24				54.6 54.0 52.9					
SS	2.0	0.5	19 11 9 7				52.0 51.5					
							50.0	5				
TOTAL DEPTH = 6.0 FT.										Augered to total depth of 6.0'. 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging and hole was backfilled with drilling spoils.		
* Core recovery refers to total soil & rock sample.										Ground elevation estimated from topographic map.	Description & classification by visual examination of sample.	Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	C006-2
SITE				COORDINATES			ANGLE FROM HORIZ		BEARING		
MISS on Site				N 9688.0; E 9566.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
1-2-91	1-2-91	Hydro Group, Inc.	Soil Sentry	8"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.2/78°		0	4	NA	56.0	/ none ATD		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.7	5 3 4				56.0			0.0 - 5.0 ft: FILL.	Complete borehole number is B3890C006-2.
SS	2.0	1.6	2 4 7 45				54.3 54.0			0.0 - 3.6 ft: Sandy Silt, Gravel and cowhides; Moderate brown (5YR3/4) to Dark yellowish brown (10YR2/2), fine to coarse grained; cowhides are grayish blue (5PB5/2), texture resembles paper.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	44 24 14 6				52.4 52.0			4.0 - 5.0 ft: Silty Sand and Coal; Moderate yellowish brown (10YR5/4) and Black (N1); coal <10%; gravel <10%.	Augered to 2.0'.
SS	2.0	1.9	3 11 8 4				51.0 50.0 49.4 49.1			6.0 - 6.6 ft: Silty GRAVEL, (GM); Medium light gray (N6), fine to very coarse grained, subangular to subrounded, no plasticity.	Augered to 4.0'.
							48.1 48.0			6.6 - 6.9 ft: Silty SAND, (SM); Black (N1), very fine to medium grained, well sorted, sand -70%, silt -30%, no plasticity.	Augered to 6.0'.
										6.9 - 7.9 ft: SILT, (ML); interlayered Very pale orange (10YR6/2), Dark yellowish orange (10YR5/4) and Light brown (5YR5/6), banded layers from 1/4 - 4" thick; very fine grained, well sorted, no plasticity, moist; fragment of Shale (?), Black (N1), fissile, hard, brittle between 7.8 - 7.9'.	Augered to total depth of 8.0'.
TOTAL DEPTH = 8.0 FT.										3" PVC casing inserted for gamma-logging.	PCV casing was removed after logging and hole was backfilled with drilling spoils.



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
MISS on Site				N 9951.0; E 9903.0		14501	1 OF 1	C007					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
MISS on Site			N 9951.0; E 9903.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-27-90	11-27-90	Hydro Group, Inc.		Mobile B-80		8"	22.8	1.2	24.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
16.5/69*		0	12	NA	61.0	V / NR / NA		22.8/38.2					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			G. Pais							
SAMP. TYPE	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	2	2				61.0				0.0 - 12.3 ft: FILL. 0.0 - 1.2 ft: Silty Clayey Gravel; Moderate brown (5YR3/4), with brick fragments.	Complete borehole number is B3890C007.
SS	2.0	1.8	9	10				59.5				1.2 - 1.5 ft: Peat; Dusky yellowish brown (10YR2/2), fibrous, organics, wood, with white fibrous material.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	6	2				59.0				2.0 - 2.8 ft: Silt; Moderate brown (5YR3/4), clayey, slightly moist.	Augered to 4.0'.
SS	2.0	1.5	2	2				57.2				2.8 - 4.8 ft: Peat; Dusky yellowish brown (10YR2/2), Very pale orange (10YR8/2) between 3.0 - 3.2'; organic.	Augered to 6.0'.
SS	2.0	1.8	5	2				56.5	5			4.8 - 6.0 ft: Sludge; Yellowish gray (5Y8/1) changing to Light olive gray (5Y6/2) at 5.8'; silty to sandy, slightly plastic, moist.	Augered to 8.0'.
SS	2.0	1.8	5	2				53.2				6.0 - 6.3 ft: Peat; Black (N1) to Grayish black (N2), organic.	Augered to 10.0'.
SS	2.0	2.0	2	3				53.0				6.3 - 7.4 ft: Sludge; Medium gray (N5), lighter in color with depth to Light gray (N7), gravel clasts between 7.0 - 7.4'.	Augered to 12.0'.
SS	2.0	0.8	4	3				50.2	10			7.4 - 8.4 ft: Organic Silt.	Augered to 14.0'.
SS	2.0	1.9	6	16				49.0				8.4 - 9.0 ft: Sludge; Yellowish gray (5Y8/1), slightly silty.	Augered to 16.0'.
SS	2.0	1.1	8	22				48.7				9.0 - 10.2 ft: Peat; Olive black (5Y2/1) to Black (N1), organics, carbonaceous material, loose, saturated.	Augered to 18.0'.
SS	2.0	0.8	6	18				50.2				10.2 - 12.3 ft: Sludge; Grayish olive (10Y4/2), silty, organic odor, wet.	Augered to 20.0'.
SS	2.0	1.1	12	24				47.1				12.3 - 16.6 ft: Silty SAND to SILT (SM-OL); Grayish black (N2) to Black (N1), organic odor, increased silt below 13.3', soft, wet.	Augered to 22.0'.
SS	2.0	1.1	22	21				47.0					Augered to total depth of 24.0'.
SS	2.0	0.8	18	14				45.9	15				3" PVC casing inserted for gamma-logging.
SS	2.0	1.1	12	27				45.0					PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	2.0	1.0	20	32				44.4					* Core recovery refers to total soil & rock sample.
SS	2.0	1.2	9	12				44.2					Ground elevation estimated from topographic map.
SS	2.0	1.0	23	24				43.0					Description & classification by visual examination of sample.
SS	2.0	1.0	27	35				42.2					
SS	2.0	1.0	20	23				41.9					
SS	2.0	1.0	23	24				41.0	20				
SS	2.0	1.0	27	35				40.0					
SS	2.0	1.2	9	12				39.0					
SS	2.0	1.2	12	18				38.2					
SS	2.0	1.2	18	27				37.8					
SS	2.0	1.2	27	35				37.0					
TOTAL DEPTH = 24.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; 0 = OTHER

SITE

MISS on Site

Last Update: 03-31-92

HOLE NO. C007



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		ANGLE FROM HORIZ BEARING						
MISS on Site				N 9769.0; E 9230.0		Vertical -----						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
12-14-90	12-14-90	Hydro Group, Inc.	Soil Sentry	8"	18.0	2.0	20.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
9.6/48*		0	10	NA	55.0	V / -10' ATD NA		18.0/37.0				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in			none		Stephen Knuttel <i>[Signature]</i>							
SAMP TYPE	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.8	2 4 6 7				55.0				0.0 - 12.5 ft: FILL.	Complete borehole number is B3890C008.
SS	2.0	1.3	3 4 5 11				53.2 53.0				0.0 - 1.2 ft: Silty Sand; Grayish brown (5YRS/2) to Moderate reddish brown (10R4/6), fine to medium grained, poorly sorted, with sludge and debris, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	12 12 11 10				51.7 51.0				1.2 - 10.6 ft: Sand; Moderate brown (5YRS/4), medium to coarse grained, moderately sorted; gravel of mixed composition between 4.0 - 5.4'; loose, moist, wet below 10'.	Augered to 4.0'. Augered to 6.0'. Augered to 8.0'. Augered to 10.0'.
SS	2.0	1.4	2 4 6 7				49.6 49.0	5				Augered to 12.0'. Gravel at 12' may be base for sewer line. Augered to 14.0'. Augered to 16.0'. Augered to 18.0'.
SS	2.0	1.1	2 3 2 2				47.6 47.0					
SS	2.0	0.6	1 2 1/12"				45.9 45.0 44.4	10				
SS	2.0	0.5	2 4 7 9				43.0 42.5				12.0 - 12.5 ft: Gravel; Dark gray (NS), medium coarse, mixed with above and with some fine sand, Black (N1).	Augered to total depth of 20.0'. 3" PVC casing inserted to total depth for gamma-logging.
SS	2.0	0.5	3 15 18 35				41.0 40.5	15			14.0 - 16.5 ft: SAND, (SW); Black (N1), fine grained, moderately sorted, with some coarse gravel up to -0.1', Dark gray (NS), firm, moist.	PCV casing was removed after logging; hole was backfilled with drilling spoils.
SS	2.0	0.5	25 23 27 35				39.0 38.5					
SS	2.0	0.5	7 17 25 50/3"				37.0 36.5				18.0 - 18.5 ft: GRAVEL, (GW); Dark reddish brown (10RS/4), sandstone fragments.	* Core recovery refers to total soil & rock sample.
							35.0	20			TOTAL DEPTH = 20.0 FT.	Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

MISS on Site

Last Update: 03-31-92

HOLE NO. C008



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	C008-1				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
MISS on Site			N 9703.0; E 9280.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-14-90	12-14-90	Hydro Group, Inc.		Soil Sentry		8"	16.0	0.0	16.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.7/48*		0	8	NA	55.0	V / none ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knuttel						
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	2 2 4 6				55.0			0.0 - 12.1 ft: FILL.	Complete borehole number is B3890C008-1.	
SS	2.0	0.3	3 4 4 5				53.5 53.0 52.7			0.0 - 2.3 ft: Sandy Silt to Silty Sand; Grayish brown (5YR3/2) changing to Moderate reddish brown (10R4/6), mixed with sludge, White (N9); 0.2' rounded granitic pebble between 2.0 - 2.3'; firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.8	18 11 16 15				51.0	5		4.0 - 12.1 ft: Sludge; layered with bands of White (N9), Grayish black (N2) and Moderate brown (5YR3/4) between 4.0 - 6.5, White (N9) to Light gray (N8) between 8.0 - 12.1', silty to clayey, chalky, slightly plastic, firm, moist.	Augered to 4.0'.	
SS	2.0	0.5	8 8 6 4				49.2 49.0 48.5				Augered to 6.0'.	
SS	2.0	1.0	3 5 6 6				47.0 46.0				Augered to 8.0'.	
SS	2.0	0.2	3 6 6 7				45.0 44.8	10			Augered to 10.0'.	
SS	2.0	0.2	3 6 6 7				45.0 44.8				Augered to 12.0'.	
SS	2.0	1.3	8 11 12 18				43.0 42.9			12.1 - 15.1 ft: SAND (SW); Black (N1) to Grayish black (N2), fine to medium grained, moderately sorted; areas of Silty Sand, Blackish red (5R2/2) between 14.0 - 15.1'; some fine sandstone pebbles, Dark reddish brown (10R3/4) present, firm, moist.	Augered to total depth of 16.0'.	
SS	2.0	1.1	6 16 14 15				41.7 41.0 39.9 39.0	15			3" PVC casing inserted to 15.5' for gamma-logging.	
TOTAL DEPTH = 16.0 FT.										PCV casing was removed after logging; hole was backfilled with drilling spoils.		
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				MISS on Site		Last Update: 03-31-92		HOLE NO. C008-1



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				N 9815.0; E 9370.0		14501	1 OF 1	C009			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
MISS on Site			N 9815.0; E 9370.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-1-90	12-1-90	Hydro Group, Inc.	Mobile B-80		8"	14.0	2.0	16.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
11.0/69*		0	8	NA	59.0	/ none ATD / NA		14.0/45.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			G. Pais <i>[Signature]</i>						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.3	7 14 14 11				59.0		0.0 - 6.7 ft: FILL.	Complete borehole number is B3890C009.	
SS	2.0	1.8	8 6 6 5				57.7 57.0		0.0 - 1.0 ft: Gravel and Sand; Light olive gray (5Y5/2), loose, slightly moist. 1.0 - 1.3 ft: Silty Sand; Dark reddish brown (10R3/4), fine to medium grained, moderately well sorted, trace white sludge. 2.0 - 2.3 ft: Sludge; Light olive gray (5Y3/2).	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.8	4 12 13 18				55.2 55.0	5	2.3 - 6.7 ft: Sand; Olive gray (5Y3/2) changing to Dusky brown (5YR2/2) at 5.5', fine to medium grained, subangular to subrounded, some gravel; trace sludge, yellowish gray (5Y7/2).	Augered to 4.0'.	
SS	2.0	1.5	9 8 6 7				53.2 53.0 52.3		6.7 - 10.8 ft: SAND, (SW); Dark reddish brown (10R3/4) changing to Dusky brown (5YR2/2) at 8.4', fine to medium grained, subangular grains, iron-oxide staining in places, trace blocky structure, trace clay and silt, some organics and red bed cobbles, dense, firm.	Augered to 6.0'.	
SS	2.0	1.0	14 12 9 6				51.5 51.0 50.0		10.8 - 13.0 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2) to Grayish brown (5YR3/2), sand is fine to medium grained, moderately well sorted, slightly plastic in lenses.	Augered to 8.0'. Augered to 10.0'.	
SS	2.0	1.1	4 4 2 4				49.0 48.2 47.9	10		Augered to 12.0'.	
SS	2.0	1.0	3 11 18 20				47.0 46.0			Augered to 14.0'.	
SS	2.0	1.5	26 27 36 28				45.0 43.5 43.0	15	14.0 - 15.5 ft: SAND, (SW); Dark reddish brown (10R3/4), fine to medium grained, consolidated in places, iron-oxide staining and cementation.	Augered to total depth of 16.0'. 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging; hole was grouted to -12' below surface and remaining hole backfilled with drilling spoils.	
TOTAL DEPTH = 16.0 FT.											
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>											

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

MISS on Site

Last Update:
03-31-92

HOLE NO.
C009



GEOLOGIC DRILL LOG										PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
SITE										COORDINATES				ANGLE FROM HORIZ		BEARING	
MISS on Site										N 9603.0; E 9727.0				Vertical		-----	
BEGUN		COMPLETED		DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN		ROCK (FT.)		TOTAL DEPTH			
11-29-90		11-29-90		Hydro Group, Inc.			Mobile B-80		8"	4.0		6.0		10.0			
CORE RECOVERY (FT./%)			CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.1/61*			0		5		NA		56.0		/ none ATD / NA		4.0/52.0				
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:									
140 lbs/30 in				none				G. Pais									
										(Template: MYMD)							
										DESCRIPTION AND CLASSIFICATION				NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
SAMP AND DIAM.	SAMP. ADV. LEN CORE	SAMP REC. CORE REC.	SAMP BLOWS % CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE								
SS	2.0	1.8	2 8 10				56.0								Complete borehole number is B3890C010.		
SS	2.0	1.7	6 6 4				54.4 54.0								Borehole sampled and gamma-logged by TMA/Eberline Corp.		
SS	2.0	0.6	6 7 7				52.3 52.0 51.4	5							Augered to 4.0'.		
SS	2.0	1.2	8 5 8 20				50.0 48.8 48.0								Augered to 6.0'.		
SS	2.0	1.0	12 18 17 13				47.0 46.0								Augered to 8.0'.		
										TOTAL DEPTH = 10.0 FT.				Augered to total depth of 10.0'. 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.			
														* Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).			
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER										SITE		MISS on Site		Last Update: 03-31-92		HOLE NO. C010	



GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	C010-1
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING		
MISS on Site			N 9603.0; E 9735.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-17-90	12-17-90	Hydro Group, Inc.	Soil Sentry		8"	4.0	2.0	6.0			
CORE RECOVERY (FT./X)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
3.9/65*		0	3	NA	56.0	/ none ATD / NA		4.0/52.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLONS	Z CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	2	7				56.0				0.0 - 2.4 ft: FILL. 0.0 - 1.0 ft: Topsoil.	Complete borehole number is B3890C010-1
SS	2.0	1.4	3	3				54.5 54.0 53.6				1.0 - 2.4 ft: Slag; Moderate brown (5Y3/4), with Black (N1) and Very light gray (N8), fine gravel size, loose, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			3	3				52.6				2.4 - 3.4 ft: Gravelly SAND, (SW); Moderate brown (5YR3/4) to Moderate reddish brown (10R3/4), sand is fine grained, moderately sorted, firm, moist.	Augered to 2.0'.
SS	2.0	1.0	3	7				52.0 51.0				4.0 - 5.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4).	Augered to 4.0'.
			7	15				50.0				TOTAL DEPTH = 6.0 FT.	Augered to total depth of 6.0'. 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging; hole was backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG						PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
MISS on Site						FUSRAP		14501	1 OF 1	C011		
SITE				COORDINATES				ANGLE FROM HORIZ		BEARING		
				N 9559.0; E 9552.0				Vertical		-----		
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
12-1-90		12-1-90		Hydro Group, Inc.		Soil Sentry		8"	18.3	1.7	20.0	
CORE RECOVERY (FT./%)			CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
10.2/51*			0	10	NA	55.0		-10' ATD NA		18.3/36.7		
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knuttel						
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. REC. CORE REC.	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	3 6 6 12				55.0				0.0 - 10.0 ft: FILL.	Complete borehole number is B3890C011.
SS	0.4	0.0	50/5"				53.6				0.0 - 1.4 ft: Silty Sand; Dark reddish brown (10R3/4), with Sludge, White (N9), and wood chips, moderately firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	2 2 5 6				51.0	5			4.5 - 5.5 ft: Peat; Brownish black (5YR2/1), organic, loose, moderately firm, crumbly, slightly moist.	Spoon refusal at 2.4'. Augered to 4.0'.
SS	2.0	0.3	16 30 15 7				48.7				5.5 - 6.0 ft: Sand and Coal Slag; Black (N1) to Grayish black (N2), fine grained to gravel size, firm, slightly moist.	Augered to 8.0'.
SS	2.0	2.0	8 11 16 15				47.0				6.0 - 6.3 ft: Wood and Coal Slag; Brownish black (5YR2/1) to Black (N1), with minor silt and roots.	Augered to 12.0'.
SS	2.0	0.2	15 21 25 36				45.0 44.8	10			8.0 - 10.0 ft: Peat; Brownish black (5YR2/1) to Black (N1), mixed with fine to medium grained sand, red brick fragments between 8.7 - 8.9'; minor roots present throughout, firm, moist.	Augered to 14.0'. Augered to 16.0'.
SS	2.0	1.3	7 9 8 9				43.0				10.0 - 18.3 ft: Silty SAND, (SM); Black (N1) to Grayish black (N2), very fine to medium grained, moderately sorted, moderately firm, wet.	Augered to 18.0'. Spoon refusal at 19.2'. Augered to total depth of 20.0'.
SS	2.0	1.3	nr				41.7 41.0					3" PVC casing inserted to total depth for gamma-logging.
SS	2.0	0.9	4 4 7 18				39.7 39.0 38.1	15				PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	1.2	0.8	14 24 50/3"				37.0 36.7 36.2					nr = not recorded.
							35.0	20			18.3 - 18.8 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4) stained Black (N1) in some areas, fine to medium grained, moderately sorted, firm, moist.	* Core recovery refers to total soil & rock sample.
										TOTAL DEPTH = 20.0 FT.	Ground elevation estimated from topographic map.	
											Description & classification by visual examination of sample.	
											Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER						SITE		MISS on Site		Last Update: 03-31-92	HOLE NO. C011	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				FUSRAP		14501	1 OF 1	C012			
SITE			COORDINATES			ANGLE FROM HORIZ BEARING					
MISS on Site			N 9576.0; E 9419.0			Vertical -----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-28-90	11-28-90	Hydro Group, Inc.	Soil Sentry		8"	17.5	0.0	17.5			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
11.4/65*		0	9	NA	58.0	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	1.6	1.3	4 8 15 50/1"				58.0		0.0 - 8.6 ft: FILL.	Complete borehole number is B3890C012.	
							56.7		0.0 - 0.3 ft: Topsoil; Silty Sand; Grayish brown (5YR3/2), with roots, soft, moist.		
SS	2.0	1.8	-4 -4 -4 -4				56.0		0.3 - 1.3 ft: Silty Sand; Dark reddish brown (10R3/4), mixed with Sludge, Very light gray (N8) to light gray (N7), hard.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
							54.2			Spoon refusal at 1.6'.	
SS	2.0	1.7	7 7 6 7				54.0	5	2.0 - 8.6 ft: Sludge; White (N9), interlayered with Light gray (N7) between 6.5 - 7.7, layer of Light olive gray (5Y5/2) between 4.0 - 5.7; granular to moderately cottony; powdery in areas, clayey and soft in others; slightly layered (-1-5 mm thick), loose, dry to slightly moist, wet below 6.5'.	Augered to 2.0'. Augered to 4.0'.	
							52.3			Augered to 6.0'.	
SS	2.0	1.7	2 2 2 2				52.0			Augered to 8.0'.	
							50.3			Augered to 10.0'.	
SS	2.0	1.6	1 1 2 5				50.0			Augered to 12.0'.	
							49.5				
							49.0		8.6 - 9.0 ft: CLAY, (CL); Black (N1), soft, moist to wet.	Augered to 14.0'.	
							48.4		9.0 - 9.6 ft: PEAT, (Pt); Black (N1), silty, loose, soft, moist.		
SS	2.0	2.0	1 1 2 1				48.0	10	10.0 - 13.3 ft: CLAY, (CL); colors ranging from Black (N1) to Light gray (N7) in layers 2 - 10 cm thick, soft, moist to wet.	Augered to 16.0'.	
										Spoon refusal at 17.5'.	
SS	2.0	1.3	1 2 2 2				44.7			3" PVC casing inserted to 16.5' for gamma-logging.	
										PCV casing was removed after logging; hole was grouted to -14' below surface and remaining hole backfilled with drilling spoils.	
SS	2.0	0.0	7 19 21 20					15			
SS	1.5	0.0	nr nr 60/6"				40.5				
TOTAL DEPTH = 17.5 FT.										nr = not recorded.	
										* Core recovery refers to total soil & rock sample.	
										Ground elevation estimated from topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; SITE				MISS on Site				Last Update: 03-31-92		HOLE NO. C012	
HX = HAND AUGER; O = OTHER											



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
MISS on Site				N 9574.0; E 9420.0		14501	1 OF 1	C012-1					
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-30-90		11-30-90		Hydro Group, Inc.		Soil Sentry		8"	14.0	3.5	17.5		
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES	EL. TOP CASING	GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
2.3/70*		0		2	NA	58.0		/ none ATD / NA		14.0/44.0			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.							
							58.0				0.0 - 14.0 ft: See Hole C012.	Complete borehole number is B3890C012-1. Hole augered directly to 14' to resample interval below 14' because of insufficient recovery in Hole C012. Borehole sampled by TMA/Eberline Corp.	
								5					
								10					
								15					
SS	2.0	1.4	17 18 28 33				44.0				14.0 - 16.9 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), stained Blackish red (5R2/2) in areas, sand is fine to medium grained, poorly sorted; minor sandstone gravel, subrounded to angular, content increasing with depth; firm, moist.	Augered to 16.0'. Spoon refusal at 17.3'. Augered to total depth of 17.5'. 3" PVC casing inserted to total depth for gamma-logging. PCV casing was removed after logging; hole was grouted to -14' below surface and remaining; hole backfilled with drilling spoils.	
SS	1.3	0.9	14 25 50/4"				42.6						
							42.0						
							41.1						
							40.5						
TOTAL DEPTH = 17.5 FT.											* Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).		
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				MISS on Site				Last Update: 03-31-92	HOLE NO. C012-1



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	C013				
MISS on Site				N 9566.0; E 9352.0		ANGLE FROM HORIZ		BEARING				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
12-14-90	12-14-90	Hydro Group, Inc.	Soil Sentry		8"	10.8	3.2	14.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.6/54*		0	7	NA	53.0	/ none ATD		10.8/42.2				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.1	1 2 2				53.0				(Template: MYWD)	
							51.9				0.0 - 8.7 ft: FILL	Complete borehole number is B3890C013.
SS	2.0	1.5	5 8 8				51.0				0.0 - 3.5 ft: Silty Sand; Very dusky red (10R2/2) to Very dark red (5R2/6), mottled with Black (N1) below 2.0'; mixed with debris, sludge and sandstone gravel; Sludge is White (N9), chalky; firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.2	3 6 9				49.5				4.0 - 8.7 ft: Sludge; interlayered Black (N1), Light gray (N7), Very light gray (N8), White (N9) and Light brown (5Y6/4); layers are 2-3 cm thick, cottony; sandy between 4.0 - 5.2', chalky, moderate plasticity, below; soft to moderately firm, moist.	Augered to 6.0'.
SS	2.0	0.5	3 3 5 5				49.0					
SS	2.0	1.4	5 7 7 11				47.8	5			8.7 - 10.8 ft: Clayey SILT, (ML); Black (N1); with organics and roots between 8.7 - 9.0', moderate plasticity below; firm, moist.	Augered to 8.0'.
SS	2.0	1.3	2 6 6 24				47.0					
SS	2.0	0.6	11 11 17 24				46.5				10.8 - 12.6 ft: Silty SAND, (SM); Dark reddish brown, (10R3/4), moderately sorted, firm, moist.	Augered to 10.0'.
							45.0					Augered to 12.0'.
							44.3					Augered to total depth of 14.0'.
							43.6					3" PVC casing inserted to total depth for gamma-logging.
							43.0	10				PCV casing was removed after logging and hole was backfilled with drilling spoils.
							42.2					* Core recovery refers to total soil & rock sample.
							41.7					Ground elevation estimated from topographic map.
							41.0					Description & classification by visual examination of sample.
							40.4					Colors from "Rock-Color Chart" (GSA, 1948).
							39.0					
TOTAL DEPTH = 14.0 FT.												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER												
SITE											MISS on Site	
Last Update: 03-31-92											HOLE NO. C013	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	C014			
MISS on Site				N 9402.0; E 9451.0		Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-30-90	11-30-90	Hydro Group, Inc.	Mobile B-80		8"	15.5	2.5	18.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
11.7/65°		0	9	NA	57.0	V / none ATD / NA		15.5/41.5			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			G. Pals <i>[Signature]</i>						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP REC. CORE	SAMP RECOV. %	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.							TIME MIN.
SS	2.0	1.8	3 6 8			57.0				0.0 - 9.0 ft: FILL.	Complete borehole number is B3890C014.
SS	2.0	1.2	2 3 3			55.2 55.0				0.0 - 0.4 ft: Silt; Moderate brown (5YR4/4), trace sand, organics, roots.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	1/12" 1 1			53.8 53.0				0.4 - 2.3 ft: Sludge; Pinkish gray (5YR8/1), powdery, friable, chalky texture.	
SS	2.0	2.0	2 1 2 1			51.6 51.0	5			2.3 - 3.2 ft: Sludge; Yellowish gray (5Y7/2) and Grayish yellow (5Y8/4), clay like, laminated, dense, slightly plastic, adhesive.	Augered to 4.0'.
SS	2.0	1.0	2 3 4			48.0				4.0 - 8.0 ft: Sludge; laminated Light gray (N7), Medium light gray (N6) and Grayish yellow (5Y8/4), clay like, trace rootlets, dense.	Augered to 6.0'. Augered to 8.0'. Augered to 10.0'. Augered to 12.0'.
SS	2.0	1.6	9 13 10 9			47.0	10			8.0 - 9.0 ft: Silt; Olive gray (5Y4/1) to Grayish yellow (5Y8/4), laminated, some clay; trace sludge, Black (N1).	Augered to 14.0'. Augered to 16.0'.
SS	2.0	0.9	12 18 18 18			45.4 45.0 44.1				10.0 - 14.7 ft: SAND, (SP); Black (N1), fine to medium grained, moderately well sorted, organics with odor, dense, moist.	Augered to total depth of 18.0'. 3" PVC casing inserted for gamma-logging.
SS	2.0	0.7	6 9 13 25			43.0 42.2	15				PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	2.0	1.1	11 20 22 25			41.0 39.9 39.0				16.0 - 17.1 ft: SAND, (SM); Dark reddish brown (10R3/4), fine to medium grained, moderately well sorted, consolidated in places, trace clay and silt.	
TOTAL DEPTH = 18.0 FT.										* Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		MISS on Site		Last Update: 03-31-92		HOLE NO. C014	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	C015				
MISS on Site				N 9423.0; E 9669.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-29-90	11-29-90	Hydro Group, Inc.		Soil Sentry		8"	18.5	0.0	18.5			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
13.1/71*		0	9	NA	56.0	V / -8' ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knuttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.4	2	33				56.0			0.0 - 8.8 ft: FILL.	Complete borehole number is B3890C015. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 11.7'. Augered to 12.0'. Spoon refusal at 13.8'. Augered to 14.0'. Spoon refusal at 15.9'. Augered to 16.0'. Augered to total depth of 18.5'. 3" PVC casing inserted to total depth for gamma-logging. PCV casing was removed after logging; hole was grouted to -8' below surface and remaining hole backfilled with drilling spoils.
			3	33				54.6			0.0 - 0.2 ft: Wood chips and grass on Silt, Black (N1).	
SS	2.0	1.8	4	33				54.0			0.2 - 5.8 ft: Sludge; White (N9) to Very light gray (N8), interlayered with Light gray (N7) between 2.0 - 5.3', and Light olive gray (5Y6/1) below 5.3'; layers 1-5 cm thick, silty to clayey, chalky to cottony texture; fine roots between 5.3 - 5.8', soft to moderately firm, moist.	
			4	33				52.2				
SS	2.0	1.8	2	33				52.0				
			3	33				50.2				
			5	33				50.0			6.0 - 8.8 ft: Gravel and Slag; Grayish brown (5YR3/2) to Moderate brown (5YR3/4); fine gravel, some organics; slag fragments are Black (N1), hard; loose, slightly moist.	
SS	2.0	1.8	8	10				48.2				
			10	8				48.0				
			8	7				47.2				
SS	2.0	1.9	2	33				46.1			8.8 - 10.5 ft: SILT, (ML); Black (N1), grading to Clayey Silt at 9.2', slightly plastic with depth, firm, moist.	
			3	33				46.0				
			5	14				45.5				
SS	1.7	1.2	17	27				44.8	10		10.5 - 16.9 ft: Silty SAND, (SM); Black (N1), very fine to fine grained, moderately sorted, minor clay, firm, moist to wet.	
			40	50/3*				44.0				
			14	30				42.8				
			30	48				42.0				
SS	1.8	1.2	14	30				40.9	15			
			33	50/4*				40.0				
			25	33				39.1				
SS	1.9	1.1	25	30				37.5				
			30	33								
			33	50/5*								
SS	2.0	0.9	16	21								
			30	35								
			35									
TOTAL DEPTH = 18.5 FT.											* Core recovery refers to total soil & rock sample.	
											Ground elevation estimated from topographic map.	
											Description & classification by visual examination of sample.	
											Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE

Update: HOLE NO.



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	C015-1					
MISS on Site				N 9425.0; E 9669.0		ANGLE FROM HORIZ		BEARING					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
12-15-90	12-15-90	Hydro Group, Inc.	Soil Sentry		8"	14.0	0.0	14.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
1.3/65*		0	1	NA	56.0	/ none ATD / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
								56.0				(Template: MYMD)	
									5			0.0 - 12.0 ft: See Hole C015.	Complete borehole number is B3890C015-1. Hole augered directly to 12' to resample interval below 12' because of insufficient recovery in Hole C015. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	4	10				44.0				12.0 - 13.3 ft: SAND, (SP); Grayish black (N2), very fine, silty with minor clay; changing to fine sand, Black (N1), well sorted at 12.6'; firm, moist to wet.	Augered to total depth of 14.0'. 3" PVC casing inserted to 12.5' for gamma-logging.
			20	27				42.7				TOTAL DEPTH = 14.0 FT.	PCV casing was removed after logging; hole was grouted to -8' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
								42.0					

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

MISS on Site

Last Update:
03-31-92

HOLE NO.
C015-1



GEOLOGIC DRILL LOG				PROJECT			JOB NO.		SHEET NO.		HOLE NO.				
SITE				COORDINATES				14501		1 OF 1		C016			
MISS on Site				N 9249.0; E 9602.0				Vertical		-----		-----			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN		ROCK (FT.)		TOTAL DEPTH	
12-1-90		12-1-90		Hydro Group, Inc.		Mobile B-80		8"		19.3		0.7		20.0	
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
16.8/84*		0		10		NA		56.0		/ NR		19.3/36.7			
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:							
140 lbs/30 in				none				G. Pais							
(Template: NYWD)															
DESCRIPTION AND CLASSIFICATION													NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
SAMP TYPE	SAMP. AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS	LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE			
SS	2.0	1.7	3	6					56.0				0.0 - 12.4 ft: FILL.		
									54.3				0.0 - 1.0 ft: Topsoil; Silt; Moderate brown (5YR3/4), loamy, organic, roots, slightly moist.		
SS	2.0	1.5	3	7					54.0				1.0 - 12.4 ft: Sludge: Very light gray (N8) to Light olive gray (5Y6/1), laminated with Black (N1) and Grayish black (N2) and trace iron-oxide staining between 4.0 - 5.7', Grayish blue green (5BG5/2) between 12.0 - 12.4'; silty to clayey, slightly plastic, dense, soft, moist.		
SS	2.0	1.7	3	3					52.5				Augered to 4.0'.		
SS	2.0	1.7	3	3					52.0				Augered to 6.0'.		
									50.3				Augered to 8.0'.		
SS	2.0	1.6	1/18"	2					50.0				Augered to 10.0'.		
									48.4				Augered to 12.0'.		
SS	2.0	1.3	2	1					48.0				Augered to 14.0'.		
									46.7				Augered to 16.0'.		
SS	2.0	1.5	1	3					46.0	10			Augered to 18.0'.		
									44.5				Spoon refusal at 19.9'.		
SS	2.0	1.6	3	7					44.0				Augered to total depth of 20.0'.		
									43.6				3" PVC casing inserted for gamma-logging.		
SS	2.0	2.0	13	14					42.4				PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.		
									42.0	15			* Core recovery refers to total soil & rock sample.		
SS	2.0	2.0	9	26					36.7				Ground elevation estimated from topographic map.		
									36.1				Description & classification by visual examination of sample.		
SS	1.9	1.9	27	29					36.0	20			Colors from "Rock-Color Chart" (GSA, 1948).		
									36.0				TOTAL DEPTH = 20.0 FT.		



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP			14501	1 OF 1	C017			
SITE				COORDINATES				ANGLE FROM HORIZ		BEARING		
MISS on Site				N 9301.0; E 9752.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-30-90	11-30-90	Hydro Group, Inc.		Mobile B-80		8"	12.0	4.0	16.0			
CORE RECOVERY (FT./X)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
11.2/70°		0	8	NA	56.0	V / none ATD / NA		12.0/44.0				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			G. Pais						
SAMP AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS LN	G.P.M.	PRESS. P.S.I.							TIME IN MIN.	(Template: MYWD)
SS	2.0	1.5	1 6 13 15				56.0			0.4 - 5.5 ft: FILL.	Complete borehole number is B3890C017.	
							54.5			0.0 - 0.4 ft: Topsoil, Moderate brown (5YR4/4), silty, organics, trace sand.		
SS	2.0	0.8	22 13 16 18				54.0			0.4 - 2.8 ft: Gravel and Sand; Olive gray (5Y4/1), with concrete and brick fragments, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
							53.2					
SS	2.0	1.5	8 6 7 9				52.0			4.0 - 5.1 ft: Silty Sand; Moderate yellowish brown (10YR5/4), fine to medium grained, moderately well sorted.	Augered to 4.0'.	
							50.5	5		5.1 - 6.0 ft: Gravel and Sand; Medium gray (N5), iron-oxide staining.		
SS	2.0	1.6	7 11 13 23				50.0			6.0 - 11.4 ft: SAND, (SP); Dark yellowish brown (10YR4/2), medium to coarse grained, coarser with depth, subangular grains, moderately well sorted, slightly moist.	Augered to 6.0'.	
							48.4					
SS	2.0	1.4	6 15 17 30				48.0				Augered to 8.0'.	
							46.6					
SS	2.0	1.4	11 21 23 20				46.0	10			Augered to 10.0'.	
							46.0					
SS	2.0	1.5	6 15 21 36				44.6				Augered to 12.0'.	
							44.0					
SS	2.0	1.5	19 23 21 40				42.5			12.0 - 15.5 ft: SAND, (SW); Dark reddish brown (10R3/4), fine to medium grained, subangular to subrounded grains, iron-oxide cement and staining.	Augered to total depth of 16.0'. 3" PVC casing inserted for gamma-logging.	
							42.0					
SS	2.0	1.5					40.5	15			PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.	
							40.0					
TOTAL DEPTH = 16.0 FT.												
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>												



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		ANGLE FROM HORIZ	BEARING				
MISS on Site				N 9153.0; E 9933.0		Vertical	-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-30-90	11-30-90	Hydro Group, Inc.	Mobile B-80	8"	6.0	2.0	8.0				
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
7.0/88*	0	4	NA	51.0	7 / none ATD 1 / NA	6.0/45.0					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in		none		G. Pais							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.7	1 4 6				51.0 50.6			0.0 - 0.4 ft. TOPSOIL; Moderate brown (5YR3/4), rootlets, organic, moist.	Complete borehole number is B3890C018.
SS	2.0	1.8	5 4 6 13				49.3 49.0			0.4 - 5.5 ft. Silty SAND, (SM); Dark reddish brown (10R3/4) to Moderate brown (5YR3/4), trace rootlets and pebbles, adhesive, dense, firm, slightly moist,	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	20 24 23 41				47.2 47.0	5			Augered to 2.0'. Augered to 4.0'.
SS	2.0	2.0	25 37 41 50				45.5 45.0			6.0 - 8.0 ft. SAND, (SM); Dark reddish brown (10R3/4), fine to medium grained, subrounded to subangular grains, moderately well sorted, well cemented with iron-oxide in places.	Augered to 6.0'.
							43.0			TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging and hole was backfilled with drilling spoils.



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES			14501	1 OF 1	C019				
MISS on Site				N 9119.0; E 9665.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
12-14-90	12-14-90	Hydro Group, Inc.	Mobile B-80	8"	14.0	0.0	14.0						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
11.7/84*		0	7	NA	52.0	V / none ATD / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.8	9 10 8 7					52.0				0.0 - 8.6 ft: FILL. 0.0 - 0.9 ft: Sandy Silt; Dark reddish brown (10R3/4), silt -60%, sand -40%, no plasticity, moist.	Complete borehole number is B3890C019.
SS	2.0	1.3	7 4 8 6					50.2 50.0				0.9 - 8.6 ft: Sludge; Grayish black (N2) mottled with White (N9) changing to Bluish white (5B9/1) at 2.0' and to White (N9) at 4.0' with Very pale orange (10YR8/2) below 6.0'; silty, very fine grained, texture resembles "melted marshmallows", no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 2.0'. Augered to 4.0'. Augered to 6.0'. Augered to 8.0'.
SS	2.0	1.7	6 8 6 5					48.7 48.0	5			8.6 - 10.4 ft: Sandy to Clayey SILT, (ML); Medium dark gray (N4) very fine to medium grained, silt -70%, sand and clay -30%; sandy to 9.8', clayey with low plasticity below; moist.	Augered to 10.0'.
SS	2.0	1.6	4 2 2 3					46.3 46.0				10.4 - 11.5 ft: SAND, (SW); Dark yellowish brown (10YR4/2), Brownish black (5YR2/1) between 12.3 - 13.2, changing to Dusky yellowish brown (10YR2/2) at 13.8'; very fine to coarse grained, well graded, subangular to subrounded grains, no plasticity, moist to wet with depth.	Augered to 12.0'. Augered to total depth of 14.0'. 3" PVC casing inserted for gamma-logging.
SS	2.0	2.0	4 5 6 13					44.4 44.0 43.4					
SS	2.0	1.5	14 17 17 23					41.6	10				
SS	2.0	1.8	18 19 24 27					40.5 40.0					
								38.2 36.0					
TOTAL DEPTH = 14.0 FT.											PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.		
* Core recovery refers to total soil & rock sample.													
Ground elevation estimated from topographic map.													
Description & classification by visual examination of sample.													
Colors from "Rock-Color Chart" (GSA, 1948).													



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
MISS on Site				N 9042.0; E 9820.0		14501	1 OF 1	C020				
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-14-90		12-14-90	Hydro Group, Inc.	Mobile B-80		8"	15.0	0.0	15.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
12.6/84%		0	8	NA	52.0	/ none ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.H.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.7	2	5				52.0			0.0 - 4.7 ft: FILL. 0.0 - 1.7 ft: Sandy Silt; Dark reddish brown (10R3/4) changing to Grayish black (N2) at 1.4', silt -70%, sand -20%, gravel -10%, fine to medium grained, no plasticity, moist.	Complete borehole number is B3890C020.
SS	2.0	1.8	1	1				50.3			2.0 - 3.0 ft: Silt; Very pale orange (10YR8/2), silt -80%, clay -20%, no plasticity.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	2	3				48.2			3.0 - 3.6 ft: Cinders and Slag; Light brown (5YR5/6), fine to very coarse grained, with roots, no plasticity.	Augered to 2.0'.
			4	4				48.0			3.6 - 4.2 ft: Silt; Very pale orange (10YR8/2), silt -80%, clay -20%, no plasticity.	Augered to 4.0'.
			8	8				47.3	5		4.2 - 4.7 ft: Cinders and Coal; Grayish black (N2), fine to medium grained, silty.	
SS	2.0	1.7	13	14				46.0			4.7 - 7.1 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4) changing to Grayish orange (10YR7/4) at 6.0', very fine to medium grained, silt -70%, sand -30%, in layers -1/4" thick, no plasticity, moist.	Augered to 6.0'.
			16	19				44.9			7.1 - 16.0 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4) changing to Grayish black (N2) at 10.0', to Pale brown (5YR5/2) at 11.0' and to Light brown (5YR5/6) at 13.0'; fine grained, well sorted between 7.1 - 7.7', fine to very coarse grained, well graded below; sand -80%, silt -20%; solvent odor between 10.0 - 11.0'; no plasticity, moist.	Augered to 8.0'.
SS	2.0	2.0	17	20				44.0				Augered to 10.0'.
			37	50/6"				44.3	10			Spoon refusal at 11.0'.
SS	1.0	1.0	37	50/6"				44.0				Augered to 11.0'.
SS	2.0	1.0	12	5				40.0				Augered to 13.0'.
			11	17				39.0				Augered to total depth of 15.0'.
SS	2.0	2.0	23	17				37.0	15			3" PVC casing inserted for gamma-logging.
			19	20								PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.
TOTAL DEPTH = 15.0 FT.												

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES	ANGLE FROM HORIZ		BEARING				
MISS on Site				N 9815.0; E 9870.0	Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-28-90	11-28-90	Hydro Group, Inc.	Soil Sentry	8"	10.0	4.0	14.0				
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
10.7/76°	0	7	NA	59.0	7 / -12' ATD NA	10.0/49.0					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOCKS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.9	3 7 14 14				59.0			0.0 - 6.5 ft: FILL. 0.0 - 3.8 ft: Sandy Silt to Silty Sand; Moderate brown (5YR3/4) to Moderate reddish brown (10R4/6), with minor gravel of mixed composition, wood fragments present, firm, moist; layer of Peat, Black (N1) to Brownish black (5YR2/1), between 1.8 - 2.2'.	Complete borehole number is B3890C021. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.9	7 14 24 25				57.1 57.0			3.8 - 6.5 ft: Sludge; Light olive gray (5Y5/2) with minor Black (N1), changing to White (N9) to Medium gray (N5) at 4.0'; mixed with peat between 3.8 - 3.9'; cottony in areas, soft to moderately firm, moist.	Augered to 4.0'.
SS	2.0	1.1	6 12 30 27				55.1 55.0 53.9	5		6.5 - 7.3 ft: Clayey SILT, (ML); Black (N1); increased clay between 6.5 - 6.8', more organics below; moderately firm, moist.	Augered to 6.0'.
SS	2.0	1.2	6 7 14 17				53.0 52.5 51.8 51.0			8.0 - 9.6 ft: Clayey, Sandy SILT, (ML); Mottled between grays (N2 to N4), and Moderate reddish brown (10R4/6), sandstone gravel common, soft to moderately firm, moist, highly disturbed.	Augered to 8.0'.
SS	2.0	1.6	4 4 5 5				49.4 49.0	10		10.0 - 13.5 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), minor clay and sandstone gravel, gravel content increases with depth, firm, moist.	Augered to 10.0'. Augered to 12.0'.
SS	2.0	1.5	6 18 36 50				47.5 47.0 45.5 45.0			TOTAL DEPTH = 14.0 FT.	Augered to total depth of 14.0'. 3" PVC casing inserted to total depth for gamma-logging. PCV casing was removed after logging; hole was grouted to -7' below surface and remaining hole backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				N 9950.0; E 10150.0		14501	1 of 1	C022			
SITE		COORDINATES				ANGLE FROM HORIZ BEARING					
MISS on Site		N 9950.0; E 10150.0				Vertical -----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-19-90	11-19-90	Hydro Group, Inc.		Mobile B-80		8"	12.0	3.0	15.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
9.2/61*		0	8	NA	62.0	/ NR / NA		12.0/50.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.7	3 7 8 9				62.0		0.0 - 5.2 ft: FILL. 0.0 - 1.4 ft: Clayey Silt; Moderate brown (5YR4/4), silt -60%, clay -20%, sand -20%, fine to medium grained. 1.4 - 2.2 ft: Gravelly Sand; Light gray (N6) mixed with Brownish gray (5YR4/1) and Light brown (5YR5/6), moist. 2.2 - 3.2 ft: Coal, Gravel, Slag, Sand, and Silt; Grayish black (N2) to Pale yellowish orange (10YR8/6), conglomerated mix. 3.2 - 5.2 ft: Sludge; Pale yellowish orange (10YR8/6) changing to White (N9) at 3.3', to Dark yellowish orange (10YR6/6) at 4.3', and to Very pale orange (10YR8/2) mixed with Pale yellowish orange (10YR8/6) at 4.6'; clayey to silty, low plasticity, moist.	Complete borehole number is B3890C022.	
SS	2.0	1.9	5 3 3 3				60.3 60.0		1.4 - 2.2 ft: Gravelly Sand; Light gray (N6) mixed with Brownish gray (5YR4/1) and Light brown (5YR5/6), moist. 2.2 - 3.2 ft: Coal, Gravel, Slag, Sand, and Silt; Grayish black (N2) to Pale yellowish orange (10YR8/6), conglomerated mix. 3.2 - 5.2 ft: Sludge; Pale yellowish orange (10YR8/6) changing to White (N9) at 3.3', to Dark yellowish orange (10YR6/6) at 4.3', and to Very pale orange (10YR8/2) mixed with Pale yellowish orange (10YR8/6) at 4.6'; clayey to silty, low plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.6	3 3 24 21				58.1 58.0		2.2 - 3.2 ft: Coal, Gravel, Slag, Sand, and Silt; Grayish black (N2) to Pale yellowish orange (10YR8/6), conglomerated mix. 3.2 - 5.2 ft: Sludge; Pale yellowish orange (10YR8/6) changing to White (N9) at 3.3', to Dark yellowish orange (10YR6/6) at 4.3', and to Very pale orange (10YR8/2) mixed with Pale yellowish orange (10YR8/6) at 4.6'; clayey to silty, low plasticity, moist.	Augered to 4.0'.	
SS	2.0	2.0	17 7 8 9				56.8 56.4 56.0	5	5.2 - 6.5 ft: Sandy SILT, (ML); Pale yellowish brown (10YR6/2), fine to very coarse grained, silt -60%, sand -40%, no plasticity.	Augered to 6.0'.	
SS	2.0	1.6	2 7 12 50				55.5 55.1 54.5 54.0		6.5 - 6.9 ft: Silty SAND, (SM); Light brown (5YR5/6).	Augered to 8.0'.	
SS	2.0	1.6	2 7 12 50				55.5 55.1 54.5 54.0		6.9 - 7.5 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2), fine to medium grained, silt -70%, sand -30%, low plasticity.	Augered to 10.0'.	
SS	0.3	0.0	50/4*				52.4	10	7.5 - 8.0 ft: Silty SAND, (SM); Pale yellowish brown (10YR6/2), sand -80%, silt -20%, fine to coarse grained, subrounded to subangular grains, well graded, no plasticity.	Spoon refusal at 10.3'.	
NQ	1.5	0.0	na				50.0 49.6		8.0 - 9.6 ft: SAND, (SW); Pale red (10R6/2), fine to very coarse grained, subrounded to subangular grains, no plasticity.	Switch to core barrel.	
NQ	3.0	0.4	na				50.0 49.6		12.0 - 12.4 ft: SANDSTONE; Dark reddish brown (10R3/4), fine grained, blocky, iron-oxide cement.	Rock cored to 12.0'. Rock cored to 15.0'. Hole terminated because of insufficient recovery.	
							47.0	15	TOTAL DEPTH = 15.0 FT.	3" PVC casing inserted to -10.5' for gamma-logging (logging below 10.5' completed in open borehole). PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.	

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA 1948).



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	C022-1
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
MISS on Site			N 9950.0; E 10154.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-19-90	11-19-90	Hydro Group, Inc.	Mobile B-80	8"	12.3	0.0	12.3			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.6/84°		0	3	NA	62.0	V / none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
							62.0			(Template: MYLD)	
										0.0 - 8.0 ft: See Hole C022.	Complete borehole number is B3890C022-1. Hole augered directly to 8' to resample interval below because of insufficient recovery in Hole C022. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 9.3'. Augered to 9.5'.
SS	1.3	1.3	3 50/4"				54.0			8.0 - 10.0 ft: SAND, (SP); Pale reddish brown (10R5/4), fine to medium grained, rounded to subrounded grains, well sorted, no plasticity, moist.	Spoon refusal at 10.8'. Augered to 11.0'.
SS	1.3	1.0	41 33 50/4"				52.7 52.5 52.0	10		10.0 - 11.5 ft: Clayey SILT, (ML); Moderate brown (10YR4/4), silt -80%, clay -20%, very fine grained, no plasticity, moist; layer of Sand, well sorted, between 11.4 - 11.5'.	Spoon refusal at 12.3'. Augered to 12.0'.
SS	1.3	1.3	40 45 50/4"				51.5 51.0 50.6 50.5 49.7			11.5 - 12.3 ft: Sandy SILT, (ML); banded Light brown (5YR6/4 - 5YR5/6), Pale yellowish brown (5YR4/4) and Light greenish gray (5G8/1) changing to Moderate yellowish brown (10YR5/4) at 11.8'; silt -70-90%, sand -10-30%, no plasticity, moist.	3" PVC casing inserted for gamma-logging. PCV casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 12.3 FT.											

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		ANGLE FROM HORIZ		BEARING			
MISS on Site				N 9946.0; E 10154.0		Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-20-90	11-20-90	Hydro Group, Inc.		Mobile B-80		8"	12.0	2.5	14.5		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
1.2/60°		0	3	NA	62.0	/ none ATD / NA		12.0/50.0			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>					
SAMP TYPE	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	PRESSURE TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							62.0				
										0.0 - 12.0 ft: See Holes C022 and C022-1.	Complete borehole number is B3890C022-2. Hole augered directly to 12' to resample interval below because of insufficient recovery in Hole C022. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 12.8'. Augered to 13.0'. Spoon refusal at 13.6'. Augered to 13.6'. Switch to core barrel. Rock cored to 14.5'. Hole terminated because of insufficient recovery.
SS	0.8	0.6	45				50.0			12.0 - 13.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -80%, sand -20%, trace sandstone cobbles, moist.	Augered to total depth of 14.5'. 3" PVC casing inserted for gamma-logging.
SS	0.6	0.6	150/8"				49.4				
NQ	0.9	0.0	na				48.4				
							47.5			TOTAL DEPTH = 14.5 FT.	PCV casing was removed after logging and hole was backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart"



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				FUSRAP		14501	1 OF 1	C022-2			
SITE			COORDINATES			ANGLE FROM HORIZ/BEARING					
			N 9946.0; E 10154.0			Vertical -----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-20-90	11-20-90	Hydro Group, Inc.	Mobile B-80	8"	12.0	2.5	14.5				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
1.2/48"		0	3	NA	62.0	V / none ATD W / NA		12.0/50.0			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in			none		Robert Cook						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LOSS IN CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.					
							62.0			(Template: MYMD)	
										0.0 - 12.0 ft: See Holes C022 and C022-1.	Complete borehole number is B3890C022-2. Hole augered directly to 12' to resample interval below because of insufficient recovery in Hole C022. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 12.8'. Augered to 13.0'. Spoon refusal at 13.6'. Augered to 13.6'. Switch to core barrel. Rock cored to 14.5'. Hole terminated because of insufficient recovery.
SS	0.8	0.6	45 50/3"				50.0			12.0 - 13.6 ft: Sandy SILT, (ML); Dark reddish brown (10R5/4), fine grained, silt -80%, sand -20%, trace sandstone cobbles, moist.	Augered to total depth of 14.5'. 3" PVC casing inserted for gamma-logging.
SS	0.6	0.6	150/8"				49.4				
NQ	0.9	0.0	na				48.4				
							47.5				
TOTAL DEPTH = 14.5 FT.											PCV casing was removed after logging and hole was backfilled with drilling spoils.
											* Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.		
MISS on Site				N 9946.0; E 10152.0			14501	1 OF 1	C022-3		
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
1-15-91		1-15-91		Hydro Group, Inc.		Mobile B-80		8"	12.0	4.0	16.0
CORE RECOVERY (FT./%)			CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
1.1/55*			0	2	NA	62.0	/ NR / NA		12.0/50.0		
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Robert Cook <i>[Signature]</i>					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS RECOVERY	LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: NYMD)	
										DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							62.0			0.0 - 12.0 ft: See holes C022 and C022-1.	Complete borehole number is B3890C022-3. Hole augered directly to 14' to resample interval below because of insufficient recovery in Hole C022. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							50.0			12.0 - 14.0 ft: See hole C022-2; Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, silt -80%, sand -20%, trace sandstone cobbles, moist.	Spoon refusal at 14.8'. Spoon refusal at 15.4'. Augered to total depth of 16.0'. 3" PVC casing inserted for gamma-logging.
SS	0.8	0.8	10 50/3"				48.0			14.0 - 15.1 ft: SANDSTONE and Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to coarse grained, no plasticity; sandstone is fine grained, weathered, blocky, fissile; moist to wet.	PCV casing was removed after logging and hole was backfilled with drilling spoils.
SS	0.6	0.3	50 50/1"				46.9	15			
							46.0			TOTAL DEPTH = 16.0 FT.	

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				FUSRAP		14501	1 OF 1	C023			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
MISS on Site			N 10004.0; E 10025.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-26-90	11-26-90	Hydro Group, Inc.	Mobile B-80		8"	9.6	5.4	15.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
12.1/81*		0	7	NA	61.0	V / NA W / NA		9.6/51.4			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Jon Novick <i>[Signature]</i>						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE LOSS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRES. P.S.F.	TIME MIN.					
SS	2.0	2.0	2 2 4 4				61.0		0.0 - 6.7 ft: FILL. 0.0 - 0.7 ft: Silty Clay; Dark reddish brown (10R3/4), contains roots and wood, loose. 0.7 - 2.2 ft: Gravelly Sand and Sludge; Dusky yellowish brown (10YR2/2), silty, organic rich at top; changing to Sludge, White (N9), compact, crumbly, powdery at base; dry. 2.2 - 2.8 ft: Sludge; Yellowish gray (5Y8/1), clayey to silty, compact, slightly moist. 2.8 - 6.7 ft: Gravelly Sand; Dusky yellowish brown (10YR2/2), with Coal, gravel up to 2", organic rich, compactible, crumbly, dry.	Complete borehole number is B3890C023. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.4	1 1 7 4				57.6			Augered to 4.0'.	
SS	2.0	0.8	3 3 2 1				57.0				
SS	2.0	2.0	3 1 1 5				56.2	5			
SS	2.0	2.0	3 13 28 50				55.0			Augered to 6.0'.	
SS	2.0	2.0	20 24 25 23				54.3			Augered to 8.0'.	
SS	2.0	2.0	15 17 21 50/4*				51.4	10		Augered to 10.0'.	
SS	1.9	1.9					47.1			Augered to 12.0'.	
							46.0	16		Spoon refusal at 13.9'. Augered to total depth of 15.0'. 3" PVC casing inserted to total depth for gamma-logging.	
TOTAL DEPTH = 15.0 FT.										PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE MISS on Site Last Update: 03-31-92

HOLE NO. C023



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP			14501	1 OF 1	C024				
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING				
MISS on Site			N 9900.0; E 9600.0				Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-27-90	11-27-90	Hydro Group, Inc.		Mobile B-80		8"	12.4	1.6	14.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
12.3/88*		0	7	NA	57.0	/ none ATD / NA		12.4/44.6					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			G. Pais								
SAMP. TYPE	SAMP. DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS RECOVERY	WATER PRESSURE-TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS	P.S.I.	TIME MIN.						
SS	2.0	1.4		9 12 13 14				57.0				0.0 - 10.7 ft: FILL.	Complete borehole number is B3890C024.
SS	2.0	2.0		9 7 7 8				55.6 55.0				0.0 - 0.2 ft: Gravel; Light olive gray (5Y5/2), loose. 0.2 - 0.5 ft: Organic Silt; Moderate brown (5YR4/4), rootlets, trace clay, dense.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0		3 5 3 6				5				0.5 - 8.0 ft: Sludge; Pinkish gray (5Y8/1) to Grayish pink (5YR8/2) to Pale red (5R6/2), silty to sandy, laminated in places, chalky texture, tubules, rootlets, slightly moist to moist.	Augered to 4.0'.
SS	2.0	2.0		2 1 3 4								8.0 - 8.5 ft: Silt; Light olive gray (5Y5/2), trace to some clay, moist to wet.	Augered to 6.0'.
SS	2.0	2.0		3 9 10 15								8.5 - 10.0 ft: Organic Silt; Grayish black (N2), slightly sandy, carbonaceous.	Augered to 8.0'.
SS	2.0	1.8		7 12 13 11				10				10 - 10.7 ft: Sludge; Pale yellowish brown (10YR6/2), clayey, soft, very slightly plastic, moist.	Augered to 10.0'.
SS	2.0	1.1	nr					46.3 45.2 45.0 44.6 43.9 43.0				10.7 - 12.4 ft: Silty SAND (SM); Dusky brown (5YR2/2) to Black (N2), fine to medium grained, subangular to subrounded grains, moderately well sorted, trace organic material and clay, organic odor, moist.	Augered to 12.0'.
												12.4 - 13.1 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, subangular to subrounded grains, moderately well sorted, iron-oxide cement, consolidated in places, friable.	Augered to total depth of 14.0'.
TOTAL DEPTH = 14.0 FT.												3" PVC casing inserted to total depth for gamma-logging.	
												PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.	
												nr = not recorded.	
												* Core recovery refers to total soil & rock sample.	
												Ground elevation estimated from topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				MISS on Site		Last Update: 03-31-92		HOLE NO. C024	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	C024-1				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
MISS on Site			N 9902.0; E 9600.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
12-17-90	12-17-90	Hydro Group, Inc.	Soil Sentry	8"	12.0	0.0	12.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
4.2/70*		0	3	NA	57.0	V / NR NA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knuttel						
SAMP AND DIAM.	SAMP. ADV. LEN CORE	SAMP REC. CORE REC.	SAMP BLONS % CORE RECOVERY	LOSS IN G.P.M	WATER PRESSURE P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: NYWD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.5	5				57.0			0.0 - 5.2 ft: FILL. 0.0 - 0.3 ft: Gravel; road base.	Complete borehole number is B3890C024-1.	
SS	2.0	1.5	6 5 4				55.5 55.0			0.3 - 5.2 ft: Sludge; Medium dark gray (N4) to Light gray (N8) to White (N9), chalky; organic material between 0.3 - 0.6'; soft to very, very soft, moist.	Borehole sampled by TMA/Eberline Corp.	
SS	2.0	1.2	1/24"				53.5 53.0					
SS	6.0	nr	wor/-6'				51.8	5		6.0 - 12.0 ft sample not opened.	Augered to 6.0'. Split spoon dropped in hole to sample 6 - 8' interval and spoon sank to -12'; hole abandoned.	
							10					
							45.0			TOTAL DEPTH = -12.0 FT.	Hole backfilled with drilling spoils.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER										Last Update: 03-31-92		HOLE NO. C024-1
SITE MISS on Site												



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP			14501	1 OF 1	C024-2				
SITE				COORDINATES				ANGLE FROM HORIZ	BEARING				
MISS on Site				N 9900.0; E 9605.0				Vertical	-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
12-17-90	12-17-90	Hydro Group, Inc.		Soil Sentry		8"	12.3	1.7	14.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.0/50*		0	4	NA	57.0	/ NR / NA		12.3/44.7					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>							
SAMP. TYPE	TYPE	ADV. LEN.	REC. CORE	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: NYMD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							57.0					0.0 - 6.0 ft: See Holes C024 and C024-1.	Complete borehole number is B3890C024-2. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							51.0	5				6.0 - 6.9 ft: FILL; Sludge, White (N9) to Very light gray (N8), soft, wet.	Augered to 6.0' without sampling.
							50.1					6.9 - 7.1 ft: Organic SILT, (OL); Black (N1), minor sand, with roots, soft, wet.	
							49.9					8.0 - 10.1 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), sand is fine grained, moderately sorted, moderately firm, moist to wet.	Augered to 8.0'.
							49.0					10.1 - 12.3 ft: SAND, (SW); Black (N1), fine grained, moderately sorted, with organics, silty in places, firm, wet.	Augered to 10.0'.
							48.5					12.3 - 13.3 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted, gravel is sandstone, firm, moist.	Augered to 12.0'.
							47.0	10				TOTAL DEPTH = 14.0 FT.	Augered to total depth of 14.0'.
							46.9						3" PVC casing inserted to 13.2' for gamma-logging.
							45.9						PCV casing was removed after logging and hole was backfilled with drilling spoils.
							45.0						* Core recovery refers to total soil & rock sample.
							44.7						Ground elevation estimated from topographic map.
							43.7						Description & classification by visual examination of sample.
							43.0						Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				MISS on Site		Last Update: 03-31-92		HOLE NO. C024-2	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	WOLE NO.			
MISS on Site				FUSRAP		14501	1 OF 1	C025			
SITE			COORDINATES			ANGLE FROM HORIZ BEARING					
MISS on Site			N 9650.0; E 9500.0			Vertical -----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-28-90	11-28-90	Hydro Group, Inc.	Mobile B-80	8"	13.2	0.8	14.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
10.3/74*		0	7	NA	59.0	V / none ATD / NA		13.2/45.8			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			G. Pais						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	LOSS IN G.P.M.	WATER PRESSURE P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	2.0	1 2 3				59.0			0.0 - 7.3 ft: FILL. 0.0 - 0.6 ft: Organic Silt; Moderate brown (5YR3/4), with roots, trace clay, slightly moist. 0.6 - 7.3 ft: Sludge, mottled and laminated, Yellowish gray (5Y2/2), Light olive gray (5Y5/2), Dusky yellow (5Y6/4) and Light gray (N7) to Medium gray (N6); clayey to silty, chalky texture in places, trace sand, moderately plastic, moist.	Complete borehole number is B3890C025. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	1 2 4 3				55.4 55.0 54.5	5			Augered to 4.0'.
SS	2.0	0.5	4 2 3 2				53.0				Augered to 6.0'.
SS	2.0	1.7	1 3 3 6				51.7 51.3 51.0			7.3 - 13.2 ft: PEAT, (Pt); Black (N1), carbonaceous, strong organic odor, moist.	Augered to 8.0'.
SS	2.0	1.2	2 3 3 2				49.8 49.0	10			Augered to 10.0'.
SS	2.0	1.7	1 1 4 2				47.3 47.0				Augered to 12.0'.
SS	2.0	1.6	4 9 17 31				45.8 45.4 45.0			13.2 - 13.6 ft: SAND, (SP); Dark reddish brown (10R3/4), fine to medium grained, moderately well sorted, iron-oxide cement, consolidated in places, dense.	Augered to total depth of 14.0'.
TOTAL DEPTH = 14.0 FT.										3" PVC casing inserted for gamma-logging. PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

MISS on Site

Last Update: 03-31-92

HOLE NO. C025

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				N 9300.0; E 9700.0		14501	1 OF 1	C026			
SITE		COORDINATES				ANGLE FROM HORIZ	BEARING				
MISS on Site		N 9300.0; E 9700.0				Vertical	-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-30-90	11-30-90	Hydro Group, Inc.		Soil Sentry		8"	18.3	1.7	20.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
12.7/64*		0	10	NA	56.0	-10' ATD NA		18.3/37.7			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.9	2				56.0			0.0 - 11.1 ft: FILL. 0.0 - 0.4 ft: Silty Sand; Grayish black (N2), with roots, soft, moist.	Complete borehole number is B3890C026.
SS	2.0	1.5	2				54.1 54.0			0.4 - 10.4 ft: Sludge, layered, colors from White (N9) to Medium dark gray (N4), layers from 1-10 cm thick, creamy to chalky textured, some cottony texture, soft, moist to wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	1				52.5 52.0				Augered to 8.0'. Augered to 10.0'. Augered to 12.0'. Augered to 14.0'. Augered to 16.0'.
SS	2.0	0.0	1/2'				50.0				
SS	2.0	1.8	1/12" 1/12"				48.0			10.4 - 11.0 ft: Sand; Medium gray (N6), fine grained, well sorted, soupy, wet.	Spoon refusal at 18.7'.
SS	2.0	1.8	4 8 11 19				46.2 46.0	10		11.0 - 11.1 ft: Sludge, White (N9), creamy, soft, wet.	Augered to 18.0'.
SS	2.0	1.7	8 9 14 14				44.2 44.0			11.1 - 18.3 ft: SAND, (SW); Grayish brown (5YR3/2) changing to Black (N1) to Grayish black (N4) at 12.8', fine to medium grained, poorly to moderately well sorted, no stratification, moderately firm, moist to wet.	Spoon refusal at 19.8'. Augered to total depth of 20.0'. 3" PVC casing inserted to total depth for gamma-logging. PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.
SS	2.0	0.9	7 9 14 16				42.3 42.0				
SS	0.7	0.5	38 50/2"				41.1 40.0	15			
							39.5				
SS	1.6	0.6	13 15 50 50/1"				38.0 37.7 37.4			18.3 - 18.6 ft: Gravelly, Silty SAND; Dark reddish brown (10R3/4), sandstone gravel.	* Core recovery refers to total soil & rock sample.
							36.0	20		TOTAL DEPTH = 20.0 FT.	Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

MISS on Site

Last Update: 03-31-92

HOLE NO. C026



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	C027				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
MISS on Site			N 9493.0; E 9734.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-29-90	11-29-90	Hydro Group, Inc.	Soil Sentry		8"	9.0	1.0	10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.7/67*		0	5	NA	55.0	-6' ATD NA		9.0/46.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOCKS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.9	1 4 7 16				55.0 54.4			0.0 - 0.6 ft: Silty, Gravelly SAND, (SW); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted, with roots.	Complete borehole number is B3890C027.	
SS	2.0	0.9	28 14 16 30				53.1 53.0 52.1			0.6 - 2.9 ft: Silty, Sandy GRAVEL, (GW); Black (N1) to Grayish black (N2), fine gravel, loose, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.3	7 14 14 19				51.0 49.7	5		4.0 - 6.2 ft: SAND, (SW); Black (N1), fine to medium grained, moderately sorted; increased silt and clay between 4.5 - 5.3'; moderately firm, moist to wet.		
SS	1.9	1.4	15 18 30 50/5*				49.0 48.8 47.6			6.2 - 7.4 ft: Clayey SAND, (SC); Pale Brown (5YR5/2), sand is fine grained, moderately well sorted, firm, moist.	Spoon refusal at 7.9'.	
SS	1.4	1.2	20 50 50/5*				47.0 46.0 45.8			8.0 - 9.0 ft: SAND, (SW); Moderate reddish brown (10R4/6) to Grayish brown (5YR3/2), medium to coarse grained, in layers 0.1 - 0.2' thick, moderately sorted within the layers, firm, wet.	Augered to 8.0'. Spoon refusal at 9.4'.	
							45.0	10		9.0 - 9.2 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted, with sandstone gravel, firm, moist.	Augered to total depth of 10.0'. 3" PVC casing inserted to total depth for gamma-logging. PCV casing was removed after logging; hole was backfilled with drilling spoils.	
										TOTAL DEPTH = 10.0 FT.		
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>												
SS = SPLIT SPOON; NO = CORE BARREL; SITE										Last Update: 03-31-92		
MISS on Site										HOLE NO. C027		



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.	
MISS on Site				FUSRAP			14501	1 OF 1	C028	
SITE				COORDINATES			ANGLE FROM HORIZ		BEARING	
MISS on Site				N 9355.0; E 9820.0			Vertical		-----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
11-29-90	11-29-90	Hydro Group, Inc.		Mobile B-80		8"	0.3	11.7	12.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
8.5/71*		0	6	NA	56.0	/ none ATD / NA		0.3/55.7		
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in			none			G. Pais				
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE LOSS	CORE RECOVERY	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.8	8	8		56.0			(Template: MYWD) 0.0 - 0.3 ft: Organic SILT, (OL); Moderate brown (5YR3/4), slightly clayey, trace staining on rootlets, slightly moist. 0.3 - 12.0 ft: SILT and Silty SAND, (ML-SM); Dark reddish brown (10R3/4), interbedded, sand is fine to medium grained, subangular to subrounded grains, moderately well sorted; blocky texture in places, loose in others; some well cemented layers; red bed cobble, 2 x 3" at 3.1'. TOTAL DEPTH = 12.0 FT.	Complete borehole number is B3890C028. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Augered to 6.0'. Spoon refusal at 7.4'. Augered to 8.0'. Augered to 10.0'. Spoon refusal at 11.4'. Augered to total depth of 12.0'. 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging; hole was backfilled with drilling spoils.
						55.7				
						54.2				
SS	2.0	1.4	9	14		54.0				
						52.6				
SS	2.0	1.6	2	6		52.0				
						50.5	5			
SS	1.4	1.4	9	10		50.0				
						48.6				
						48.0				
SS	2.0	1.1	18	11		46.9				
						46.0	10			
SS	1.4	1.3	41	32		46.0				
						44.7				
						44.0				

SS = SPLIT SPOON; NO = CORE BARREL; SITE

MISS on Site

Last Update: 03-31-82 HOLE NO. C028



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.		
MISS on Site				N 9353.0; E 9820.0			14501	1 OF 1	C028-1		
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
12-15-90		12-15-90		Hydro Group, Inc.		Soil Sentry		8"	1.2	10.5	11.7
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
4.8/41*		0	6	NA	56.0	/ none ATD / NA		1.2/54.8			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knuttel					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
							56.0				
SS	2.0	1.7	3 8 10 15				55.3			0.0 - 0.7 ft: Silty SAND, (SM); Moderate brown (5YR3/4), with roots, firm, moist.	Complete borehole number is B3890C028-1.
SS	2.0	0.2	9 15 20 25				54.8			0.7 - 1.2 ft: Organic SAND, (SW); Brownish black (5YR2/1), very coarse grained, poorly sorted, loose, with debris, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.2	9 11 12 10				54.0 53.8			1.3 - 10.3 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted; gravel is sandstone, slightly weathered, fresh between 10.0 - 10.3'; firm, moist.	Augered to 4.0'.
SS	2.0	1.3	6 7 9 9				52.0 50.8	5			Augered to 6.0'.
SS	2.0	0.1	11 10 11 10				50.0 48.7				Augered to 8.0'.
SS	1.7	0.3	6 6 6 50/2"				48.0 47.9				Augered to 10.0'.
							46.0 45.7	10			Spoon and auger refusal at 11.7'.
							44.3			TOTAL DEPTH = 11.7 FT.	3" PVC casing inserted to 11.5' for gamma-logging. PCV casing was removed after logging; hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NO = CORE BARREL; SITE

Log. Update: HOLE NO.



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		ANGLE FROM HORIZ		BEARING					
MISS on Site				N 9800.0; E 9510.0		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
12-1-90	12-1-90	Hydro Group, Inc.	Soil Sentry	8"	20.0	0.0	20.0						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
15.6/78*		0	10	NA	57.0	7 / -15' ATD NA / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:									
140 lbs/30 in		none		Stephen Knuttel									
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.6	2	2				57.0				0.0 - 12.7 ft: FILL.	Complete borehole number is B3890C029.
			2	2				55.4				0.0 - 2.8 ft: Sand; Moderate brown (5YR3/4) changing to Brownish black (5YR2/1) at 0.8' and to Grayish black (N2) at 2.0', medium grained, poorly to moderately sorted; gravelly between 0.8 - 1.6'; loose to moderately firm, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			2	3				55.0				2.8 - 3.3 ft: Peat; Brownish black (5YR2/1) to Moderate brown (5YR3/4), loose, slightly moist.	
			3	5				53.4				3.3 - 12.7 ft: Sludge; White (N9) interlayered with Very light gray (N8) and Light gray (N7), silty clay to clayey silt, cottony to chalky texture, chalkier with depth; interlayered with Clayey Silt, Black (N1), slightly plastic, between 8.6 - 12.0'; some sandy layers, 2-10 cm thick, between 10.0 - 12.0'; moist to wet.	
			5	6				51.3	5				
			2	2				51.0					
			1	1				50.2					5' section of AW rod and stinger lost in hole.
			1	1				49.0					
			2	4									Augered to 14.0'.
			8	8									Augered to 16.0'.
			10	10									Augered to 18.0'.
			2	2					10				
			2	2									Augered to total depth of 20.0'.
			2	2				44.3				12.7 - 13.5 ft: Clayey SILT, (ML); Black (N1), slightly plastic, moderately firm, moist.	3" PVC casing inserted for gamma-logging.
			6	6				43.5				13.5 - 14.0 ft: Clayey SAND, (SC); Medium gray (N5), sand is fine to medium grained, poorly sorted, slightly plastic, firm, moist.	PCV casing was removed after logging; hole was backfilled with drilling spoils.
			2	3				43.0				14.0 - 19.6 ft: SAND, (SP); Medium gray (N5) to Black (N1), fine to medium grained, moderately to moderately well sorted, slightly clayey in places, slight organic odor, firm, wet.	
			7	7				42.1	15				
			11	11				41.0					
			6	9				39.6					
			9	14				39.0					
			16	16				37.4					
			4	9				37.0					* Core recovery refers to total soil & rock sample.
			19	30				37.0	20				Ground elevation estimated from topographic map.
													Description & classification by visual examination of sample.
													Colors from "Rock-Color Chart" (GSA, 1948).
													TOTAL DEPTH = 20.0 FT.



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	C030					
MISS on Site				N 9915.0; E 9685.0		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
11-27-90	11-27-90	Hydro Group, Inc.	Soil Sentry	8"	12.0	2.0	14.0						
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK							
9.9/71*	0	7	NA	58.0	-12' ATD	12.0/46.0							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.6	4 8 8 10					58.0					
SS	2.0	1.6	6 7 10 7					56.5 56.0					
SS	2.0	1.4	2 4 8 8					54.5 54.0					
SS	2.0	1.2	2 3 6 4					52.6 52.0	5				
SS	2.0	1.7	1 1 2 5					50.8 50.0					
SS	2.0	1.6	9 12 14 27					49.4 48.3 48.0	10				
SS	2.0	1.0	21 24 30 19					46.4 46.0					
								45.0					
								44.0					
TOTAL DEPTH = 14.0 FT.													



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		ANGLE FROM HORIZ		BEARING					
MISS on Site				N 9917.0; E 9685.0		Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
12-17-90	12-17-90	Hydro Group, Inc.	Soil Sentry		8"	8.0	0.0	8.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
3.9/49*		0	4	NA	58.0	y / none ATD z / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel								
SAMP. TYPE	SAMP. DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.5	5 5 7 -16					58.0				0.0 - 6.2 ft: FILL. 0.0 - 4.6 ft: Gravelly, Silty Sand; Grayish brown (5YR3/2) to Moderate reddish brown (10R4/6), sand is fine to medium grained, poorly sorted, with debris, firm, moist.	Complete borehole number is B3890C030-1. Borehole sampled by TMA/Eberline Corp.
SS	2.0	0.5	5 8 6 12					56.5 56.0 55.5				4.6 - 6.2 ft: Sludge; White (N9), chalky to cottony texture, soft, moist.	Spoon hit rock at 1.5', skewed hole. Augered to 2.0'. Augered to 4.0'. Augered to 6.0'.
SS	2.0	1.7	8 5 7 14					54.0					
SS	2.0	0.2	7 5 5 4					52.5 52.0 51.8					
								50.0				TOTAL DEPTH = 8.0 FT.	Augered to 8.0'. Stainless steel core catcher (6 - 8') too stiff to let soft sediment in spoon; hole abandoned because of insufficient recovery. Hole backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
MISS on Site				FUSRAP		14501	1 OF 1	C030-2				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
			N 9919.0; E 9685.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
12-17-90	12-17-90	Hydro Group, Inc.		Soil Sentry	8"	12.0	2.0	14.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.5/58°		0	3	NA	58.0	V / none ATD / NA		12.0/46.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. RECOVERY %	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											0.0 - 6.0 ft: See Holes C030 and C030-1.	Complete borehole number is B3890C030-2. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							52.0	5			6.0 - 6.9 ft: FILL, Sludge; White (N9) to Pale Blue green (5BG7/2), chalky, soft, moist.	Hole augered directly to 6.0'.
							51.1				6.9 - 10.7 ft: SAND, (SW); Black (N1), mixed with Dark reddish brown (10R3/4) below 10.0'; fine grained, moderately sorted, organic material present with organic odor; with gravel and silt below 10.0', disturbed; firm, moist to wet.	Augered to 10.0' without sampling 6.0 - 8.0' interval.
							50.2					
							48.0	10				
SS	2.0	0.7	3				47.3					Augered to 12.0'.
							46.0					
SS	2.0	1.0	5				45.0				12.0 - 13.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4); sand is fine to medium grained, moderately sorted, firm, moist.	Augered to total depth of 14.0'. 3" PVC casing inserted for gamma-logging.
							44.0					
											TOTAL DEPTH = 14.0 FT.	PCV casing was removed after logging; hole was backfilled with drilling spoils.



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.	
SITE				COORDINATES			14501	1 OF 1	C031	
MISS on Site				N 9885.0; E 9875.0			ANGLE FROM HORIZ		BEARING	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-27-90	11-27-90	Hydro Group, Inc.		Soil Sentry	8"	16.5	3.5	20.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
11.2/56*		0	10	NA	61.0	-10' ATD		16.5/44.5		
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:					
140 lbs/30 in			none		Stephen Knuttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE RECOVERY	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYMD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
									LOSS IN G.P.M.	
SS	2.0	1.3	4		61.0				0.0 - 7.1 ft: FILL.	Complete borehole number is B3890C031.
			12		59.7				0.0 - 1.1 ft: Gravelly, Silty Sand; Dark reddish brown (10R3/4), sand is fine grained, moderately sorted, gravel is sandstone, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	18		59.0				1.1 - 2.1 ft: Organic Silt; Black (N1), fibrous texture; minor fine sand, White (N9); loose, slightly moist.	
			10		57.4				2.1 - 3.6 ft: Sandy Silt; Grayish brown (5YR3/2) to Grayish red (5R4/2), poorly sorted, with minor gravel of mixed composition, firm, moist.	
SS	2.0	1.1	5		57.0					
			5		55.9	5			4.0 - 7.1 ft: Mixed Sludge, Sand, and Silt; Silt is Black (N1); Sludge is Very light gray (N8) to White (N9), changing to Dark gray (N3) laminated with Medium dark gray (N4) between 6.0 - 7.1', cottony, soft, with some hard fragments, layers 1-6 mm thick, slightly moist; red brick fragments present.	
			18		55.0					
SS	2.0	1.1	14		53.9					
			16		53.0					
			18							
			14							
SS	2.0	1.2	3						8.0 - 12.5 ft: Organic SILT to PEAT, (OL-Pt); Black (N1), fine organic material, non-fibrous, moderately firm, slightly moist.	Augered to 6.0'.
			3		61.8					Augered to 10.0'.
			6		51.0	10				Augered to 14.0'.
			6							Augered to 18.0'.
			9		49.4					
SS	2.0	0.5	14		49.0					Augered to total depth of 20.0'.
			10		48.5					3" PVC casing inserted to total depth for gamma-logging.
			19		47.0				14.0 - 16.5 ft: SAND, (SW); Black (N1) changing to Pale brown (5YR5/2) at 16.5', fine grained, moderately sorted, minor silt, moderately firm, moist to wet.	PCV casing was removed after logging; hole was grouted to -7' below surface and remaining hole backfilled with drilling spoils.
			24		45.7	15				
			30		45.0					
			35		44.5					
SS	2.0	0.7	6		44.3				16.5 - 18.8 ft: SANDSTONE interlayered with Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, sandstone is fine grained, firm, moist.	
			8		43.0					
			16		42.2					* Core recovery refers to total soil & rock sample.
			14		41.0	20				Ground elevation estimated from topographic map.
			24						TOTAL DEPTH = 20.0 FT.	Description & classification by visual examination of sample.
			24							Colors from "Rock-Color Chart" (GSA, 1948).
			38							



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				FUSRAP			14501	1 OF 1	C032			
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING			
			N 9735.0; E 9800.0				Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-29-90	11-29-90	Hydro Group, Inc.		Mobile B-80		8"	10.5	1.5	12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
8.1/68*		0	6	NA	59.0	V / none ATD W / NA		10.5/48.5				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			G. Pais						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	LOSS	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					G.P.M.	P.S.F.	TIME MIN.					
SS	2.0	1.1	7 17 22 19				59.0			0.0 - 4.0 ft: FILL. 0.0 - 0.4 ft: Gravel; Light olive gray (5Y5/2), trace silt and sand, loose.	Complete borehole number is B3890C032.	
SS	2.0	1.8	17 23 31 15				57.9 57.0			0.4 - 2.0 ft: Silty Sand; Moderate brown (5YR3/4), non-adhesive, trace gravel, red bed fragments. 2.0 - 3.8 ft: Carbonaceous Fill; Black (N1), wood, charcoal, brick fragments, gravelly, loose; layer of Sludge, Yellowish gray (5Y7/2), between 3.7 - 3.8'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.4	4 6 7 4				55.2 55.0	5		4.0 - 10.5 ft: Silty SAND, (SM); Moderate olive brown (5Y4/4), sand is fine to medium grained, moderately well sorted, trace red bed pebbles; some clay, content increases with depth; moist.	Augered to 4.0'.	
SS	2.0	1.4	1 2 2 4				53.6 53.0				Augered to 6.0'.	
SS	2.0	1.0	5 8 9 8				51.6 51.0				Augered to 8.0'.	
SS	1.9	1.4	8 21 35 50/5"				60.0 49.0 48.5	10			Augered to 10.0'.	
							47.6 47.0			10.5 - 11.4 ft: SAND, (SM); Dark reddish brown (10R3/4), fine to medium grained, well cemented, iron-oxide cementation, dense, firm.	Spoon refusal at 11.4'.	
TOTAL DEPTH = 12.0 FT.											Augered to total depth of 12.0'. 3" PVC casing inserted for gamma-logging. PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.	
											* Core recovery refers to total soil & rock sample. Ground elevation estimated from topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	



GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	C033
SITE				COORDINATES				ANGLE FROM HORIZ		BEARING	
MISS on Site				N 9700.0; E 9735.0				Vertical		-----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-29-90	11-29-90	Hydro Group, Inc.		Soil Sentry	8"	4.3	2.7	7.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
4.8/69*		0	4	NA	58.0	V / none ATD NA		4.3/53.7			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS % CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
SS	2.0	1.6	4 30 22 9				58.0			0.0 - 1.6: Gravelly SAND, (SW); Dark reddish brown (10R3/4) changing to Grayish brown (5YR3/2) at 0.5', silty between 0.0 - 0.5', firm, slightly moist.	Complete borehole number is B3890C033. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	0.4	0.0	50/5*				55.0 54.7			3.0 - 3.3 ft: PEAT, (Pt); Brownish black (5YR2/1), moist, firm.	Spoon refusal at 2.4'.
SS	2.0	2.0	16 12 12 30				53.8 53.7			3.3 - 4.3 ft: SILT, (ML); Medium gray (N6), spotted with Very light gray (N8); layer of fine gravel, Black (N1), organic odor, loose, between 4.2 - 4.3'; moderately firm, moist.	Augered to 3.0'.
SS	2.0	1.2	21 18 20 16				51.8 51.0			4.3 - 6.2 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted, with gravel, layered with sandstone below 5.0', firm, moist.	Augered to 5.0'.
TOTAL DEPTH = 7.0 FT.										Augered to total depth of 7.0'.	3" PVC casing inserted to total depth for gamma-logging. PCV casing was removed after logging; hole was backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				N 9595.0; E 9615.0		14501	1 OF 1	C034			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
12-3-90		12-3-90		Hydro Group, Inc.		Mobile B-80	8"	15.2	2.8	18.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
13.5/75*		0	9	NA	56.0	V / NR W / NA		15.2/40.8			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			G. Pais					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS LN	G.P.M.	PRES. P.S.I.						TIME MIN.
SS	2.0	1.9	4 6 5 21				56.0		0.0 - 6.2 ft: FILL.	Complete borehole number is B3890C034.	
SS	2.0	1.2	7 4 3 4				54.1 54.0		0.0 - 0.3 ft: Topsoil, Sandy Silt; Moderate brown (5YR3/4), with roots, sand is fine grained.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	0.4	2 2 1 1				52.8 52.0 51.6		0.3 - 1.6 ft: Sludge; Pinkish gray (5YR8/1), chalky texture, slightly plastic, moist.		
SS	2.0	1.5	7 10 12 13				50.0 49.8	5	1.6 - 2.4 ft: Carbonaceous Material; Black (N1) to Grayish black (N2), wood fragments, charcoal, loose.	Augered to 4.0'.	
SS	2.0	1.8	nr nr nr 20				48.5 48.0		2.4 - 2.7 ft: Silt; Dusky brown (5YR2/2), friable, trace sand.	Augered to 6.0'.	
SS	2.0	1.7	8 21 35 40				46.2 46.0	10	2.7 - 3.2 ft: Sludge; Light gray (N7); red bed fragment between 3.0 - 3.1'.	Augered to 8.0'.	
SS	2.0	1.8	12 14 18 30				50.0 49.8		4.0 - 6.2 ft: Carbonaceous material; Black (N1) to Grayish black (N2), charcoal, slag and brick fragments.	Augered to 10.0'.	
SS	2.0	2.0	8 10 20 28				48.5 48.0		6.2 - 7.5 ft: SILT, (ML); Olive gray (5Y3/2), trace clay, very slightly plastic, moist.	Augered to 12.0'.	
SS	2.0	1.2	15 17 21 50				46.2 46.0	15	8.0 - 15.3 ft: Silty SAND, (SM); Grayish brown (5YR3/2), sand is fine to medium grained, trace coarse sand, subangular to subrounded grains, moderately sorted, trace clay, soft, saturated.	Augered to 14.0'.	
							44.3 44.0		15.2 - 17.2 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, subangular to subrounded grains, dense, consolidated, trace clay, interbeds of sandstone, iron-oxide cementation.	Augered to 16.0'.	
							42.2 42.0			Augered to total depth of 18.0'.	
							40.8			3" PVC casing inserted for gamma-logging.	
							40.8			PCV casing was removed after logging; hole was backfilled with grout and drilling spoils.	
							38.8 38.0				
TOTAL DEPTH = 18.0 FT.										nr = not recorded.	
										* Core recovery refers to total soil & rock sample.	
										Ground elevation estimated from topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

MISS on Site

Last Update:
03-31-92

HOLE NO.
C034

REMEDIAL INVESTIGATION REPORT

FOR THE MAYWOOD SITE

NEW JERSEY

VOLUME IV

DECEMBER 1992

Prepared for

United States Department of Energy

Oak Ridge Field Office

Under Contract No. DE-AC05-91OR21949

By

Bechtel National, Inc.

Oak Ridge, Tennessee

Bechtel Job No. 14501

APPENDIX E

**Radiological Data, Chemical Data, and Geologic Logs
for Residential Vicinity Properties**

Contents

RADIOLOGICAL DATA

Table		Page
E-1	Surface and Subsurface Radionuclide Concentrations in Soil, 70 West Hunter Avenue	E-1
E-2	Downhole Gamma Logging Results, 70 West Hunter Avenue	E-2
E-3	Gamma Radiation Exposure Rates, 70 West Hunter Avenue	E-5
E-4	Surface and Subsurface Radionuclide Concentrations in Soil, 79 Avenue B	E-6
E-5	Downhole Gamma Logging Results, 79 Avenue B	E-9
E-6	Gamma Radiation Exposure Rates, 79 Avenue B	E-13
E-7	Surface and Subsurface Radionuclide Concentrations in Soil, 90 Avenue C	E-14
E-8	Downhole Gamma Logging Results, 90 Avenue C	E-18
E-9	Gamma Radiation Exposure Rates, 90 Avenue C	E-23
E-10	Surface and Subsurface Radionuclide Concentrations in Soil, 108 Avenue E	E-24
E-11	Downhole Gamma Logging Results, 108 Avenue E	E-26
E-12	Gamma Radiation Exposure Rates, 108 Avenue E	E-30
E-13	Surface and Subsurface Radionuclide Concentrations in Soil, 112 Avenue E	E-31
E-14	Downhole Gamma Logging Results, 112 Avenue E	E-35
E-15	Gamma Radiation Exposure Rates, 112 Avenue E	E-41
E-16	Surface and Subsurface Radionuclide Concentrations in Soil, 113 Avenue E	E-42
E-17	Downhole Gamma Logging Results, 113 Avenue E	E-46
E-18	Gamma Radiation Exposure Rates, 113 Avenue E	E-54
E-19	Surface and Subsurface Radionuclide Concentrations in Soil, 62 Trudy Drive	E-55
E-20	Downhole Gamma Logging Results, 62 Trudy Drive	E-59
E-21	Gamma Radiation Exposure Rates, 62 Trudy Drive	E-69

RADIOLOGICAL DATA
(continued)

Table		Page
E-22	Surface and Subsurface Radionuclide Concentrations in Soil, 136 West Central Avenue	E-70
E-23	Downhole Gamma Logging Results, 136 West Central Avenue	E-74
E-24	Gamma Radiation Exposure rates, 136 West Central Avenue	E-84

CHEMICAL DATA

Table		Page
E-25	Metals and Rare Earths, Residential Vicinity Properties, Soil Samples	E-85
E-26	Total Petroleum Hydrocarbons, Residential Vicinity Properties, Soil Samples	E-87
E-27	PCBs, Residential Vicinity Properties, Soil Samples	E-88
E-28	TCLP Metals, Residential Vicinity Properties, Soil Samples	E-91
E-29	Corrosivity/Reactivity, Residential Vicinity Properties, Soil Samples	E-93
E-30	Mobile Ions, Residential Vicinity Properties, Soil Samples	E-95

GEOLOGIC LOGS

Property	Page
70 West Hunter Avenue	E-99
79 Avenue B	E-104
90 Avenue C	E-116
108 Avenue E	E-130
112 Avenue E	E-144
113 Avenue E	E-159
62 Trudy Drive	E-180
136 West Central Avenue	E-200

Radiological Data

Table E-1
Surface and Subsurface Radionuclide Concentrations in Soil,
70 W. Hunter Avenue

<u>Coordinates</u>		<u>Borehole No.</u>	<u>Depth (ft)</u>	<u>Concentration (pCi/g \pm 2 sigma)</u>		
<u>East</u>	<u>North</u>			<u>Uranium-238</u>	<u>Radium-226</u>	<u>Thorium-232</u>
Surface						
10900	9650		0.0 - 0.5	< 3.5	.4 \pm 0.3	< .5
10900	9800		0.0 - 0.5	< 3.6	1.2 \pm 0.5	3.2 \pm 0.7
10930	9790		0.0 - 0.5	< 7.1	.7 \pm 0.2	1.9 \pm 0.3
Subsurface						
10893	9684	B3890R639	0.0 - 1.0	< 2.8	.5 \pm 0.3	1.5 \pm 0.4
			4.0 - 6.0	< 4.3	< .7	.8 \pm 0.5
			8.0 - 10.0	< 2.1	.8 \pm 0.3	.7 \pm 0.4
10893	9719	B3890R638	1.0 - 2.0	< 2.3	1.1 \pm 0.4	1 \pm 0.5
			4.0 - 5.0	< 3.6	.6 \pm 0.3	1.3 \pm 0.5
			7.0 - 8.0	< 7.7	.8 \pm 0.4	1 \pm 0.7
10906	9796	B3890R640	0.0 - 1.0	< 2.3	1.6 \pm 0.5	4.4 \pm 0.3
			3.0 - 4.0	< 1.8	.7 \pm 0.3	.9 \pm 0.3
			5.0 - 6.0	< 2.5	.7 \pm 0.3	1.1 \pm 0.2
10917	9775	B3890R588	0.0 - 1.0	< 9.2	< 1.3	3.1 \pm 1.3
			3.0 - 4.0	< 4.5	.7 \pm 0.2	1.6 \pm 0.3
			6.0 - 8.0	< 5.9	.9 \pm 0.2	1.6 \pm 0.3
10931	9681	B3890R589	0.0 - 1.0	< 4.6	< .8	1.1 \pm 0.3
			7.0 - 8.0	< 5.9	.5 \pm 0.1	.7 \pm 0.2
			9.0 - 10.0	< 4.3	< .7	.9 \pm 0.7

Table E-2
Downhole Gamma Logging Results,
70 W. Hunter Avenue

Page 1 of 3

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R639^d</u>			
10893	9684	0.5	13000
10893	9684	1.0	14000
10893	9684	1.5	15000
10893	9684	2.0	13000
10893	9684	2.5	12000
10893	9684	3.0	12000
10893	9684	3.5	12000
10893	9684	4.0	12000
10893	9684	4.5	12000
10893	9684	5.0	11000
10893	9684	5.5	10000
10893	9684	6.0	10000
10893	9684	6.5	10000
10893	9684	7.0	10000
10893	9684	7.5	11000
10893	9684	8.0	11000
10893	9684	8.5	11000
10893	9684	9.0	10000
10893	9684	9.5	11000
<u>Borehole B3890R638^d</u>			
10893	9719	0.5	11000
10893	9719	1.0	13000
10893	9719	1.5	13000
10893	9719	2.0	13000
10893	9719	2.5	13000
10893	9719	3.0	12000
10893	9719	3.5	13000
10893	9719	4.0	13000
10893	9719	4.5	14000
10893	9719	5.0	14000
10893	9719	5.5	13000
10893	9719	6.0	14000
10893	9719	6.5	13000
10893	9719	7.0	13000
<u>Borehole B3890R640^d</u>			
10906	9796	0.5	20000
10906	9796	1.0	19000
10906	9796	1.5	14000

Table E-2
(continued)

Page 2 of 3

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R640^d</u> (continued)			
10906	9796	2.0	12000
10906	9796	2.5	10000
10906	9796	3.0	10000
10906	9796	3.5	9000
10906	9796	4.0	10000
10906	9796	4.5	10000
10906	9796	5.0	11000
10906	9796	5.5	9000
10906	9796	6.0	8000
<u>Borehole B3890R588^d</u>			
10917	9775	0.5	11000
10917	9775	1.0	16000
10917	9775	1.5	16000
10917	9775	2.0	14000
10917	9775	2.5	14000
10917	9775	3.0	14000
10917	9775	3.5	15000
10917	9775	4.0	16000
10917	9775	4.5	16000
10917	9775	5.0	16000
10917	9775	5.5	17000
10917	9775	6.0	17000
10917	9775	6.5	15000
10917	9775	7.0	15000
10917	9775	7.5	15000
<u>Borehole B3890R589</u>			
10931	9681	0.5	13000
10931	9681	1.0	13000
10931	9681	1.5	13000
10931	9681	2.0	13000
10931	9681	2.5	12000
10931	9681	3.0	12000
10931	9681	3.5	11000
10931	9681	4.0	11000
10931	9681	4.5	11000
10931	9681	5.0	11000
10931	9681	5.5	10000
10931	9681	6.0	9000

Table E-2
(continued)

Page 3 of 3

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)
<u>Borehole B3890R589 (continued)</u>			
10931	9681	6.5	8000
10931	9681	7.0	8000
10931	9681	7.5	9000
10931	9681	8.0	10000
10931	9681	8.5	9000
10931	9681	9.0	10000
10931	9681	9.5	10000
10931	9681	10.0	11000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table E-3
Gamma Radiation Exposure Rates,
70 W. Hunter Avenue

<u>Coordinates^a</u>		Rate ^b (μ R/h)
East	North	
10910	9610	6
10910	9700	8
10920	9790	11

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table E-4
Surface and Subsurface Radionuclide Concentrations in Soil,
79 Avenue B

Page 1 of 3

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
1380	2110		0.0 - 0.5	< 5	.4 \pm 0.4	< 1
1380	2130		0.0 - 0.5	< 4.2	1.6 \pm 0.7	.7 \pm 0.6
1400	2100		0.0 - 0.5	< 5.8	.6 \pm 0.4	.7 \pm 0.5
1420	2100		0.0 - 0.5	< 5.3	1 \pm 0.5	< .7
1440	2100		0.0 - 0.5	< 5.6	1.1 \pm 0.4	.9 \pm 0.8
1440	2140		0.0 - 0.5	< 6	< .5	1 \pm 0.8
1451	2110		0.0 - 0.5	< 5.1	1.6 \pm 0.4	5.6 \pm 0.8
1460	2130		0.0 - 0.5	< 7	.9 \pm 0.5	2 \pm 0.8
1462	2121		0.0 - 0.5	< 7	< 1	3.1 \pm 0.5
1463	2125		0.0 - 0.5	< 9	< 1.6	7.6 \pm 5.2
1465	2128		0.0 - 0.5	< 3.6	.9 \pm 0.1	3.1 \pm 1.7
1470	2117		0.0 - 0.5	< 9.8	4.6 \pm 0.7	68 \pm 2
1470	2120		0.0 - 0.5	< 9.7	2.6 \pm 0.8	15 \pm 2
1472	2098		0.0 - 0.5	< 6.2	< 1	2 \pm 0.1
1472	2103		0.0 - 0.5	< 4.8	< .7	1.9 \pm 0.5
1473	2110		0.0 - 0.5	< 3.1	1.6 \pm 0.3	4.0 \pm 0.9
1475	2127		0.0 - 0.5	< 5.9	< 1.0	1.4 \pm 0.6

Table E-4
(continued)

Page 2 of 3

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface						
1375	2101	B3890R362	0.0 - 1.0	< 3.2	< .7	1.0 \pm 0.3
			3.0 - 4.0	< 2.1	.3 \pm 0.1	< .5
1375	2125	B3890R363	0.0 - 1.0	< 2.9	< .6	< .7
			3.0 - 4.0	< 2	.3 \pm 0.2	< .5
			5.0 - 6.0	< 2	< .4	< .6
1429	2102	B3890R361	0.0 - 1.0	< 2.2	< .4	.6 \pm 0.3
			3.0 - 4.0	< 2.2	< .4	.7 \pm 0.1
			5.0 - 6.0	< 2.1	< .4	< .6
1439	2115	B3890R357	0.0 - 1.0	< 4.1	.6 \pm 0.3	< 1.1
			3.0 - 4.0	< 3.3	< .6	< .8
			5.0 - 6.0	< 2.2	< .4	< .6
1450	2102	B3890R356	0.0 - 1.0	< 4.2	< .9	< 1.3
			3.0 - 4.0	< 2.4	< .5	< .7
			5.0 - 6.0	< 3.1	< .6	< .8
1450	2127	B3890R355	0.0 - 1.0	< 5.3	< 1	< 1.5
			3.0 - 4.0	< 2.8	.4 \pm 0.1	< .7
1451	2117	B3890R358	0.0 - 1.0	< 7.1	1.3 \pm 0.1	4.8 \pm 1.2
			2.0 - 3.0	< 3.1	< .6	< .8
			5.0 - 6.0	< 3.1	< .6	< .8
1457	2118	B3890R429	0.0 - 1.0	< 5.1	< 1.5	4 \pm 2.8
			1.0 - 2.0	< 4.8	.5 \pm 0.3	1.7 \pm 0.5
			2.0 - 3.0	< 2.2	< .6	1.2 \pm 0.6
			3.0 - 4.0	< 2.7	.6 \pm 0.2	.8 \pm 0.4
			4.0 - 5.0	< 1.3	.8 \pm 0.2	.6 \pm 0.4
			5.0 - 6.0	< 2	< .5	1.1 \pm 0.3
1465	2122	B3890R428	0.0 - 1.0	< 5.6	< 1.4	7.4 \pm 2.1
			1.0 - 2.0	< 2.3	.5 \pm 0.4	.9 \pm 0.5
			2.0 - 3.0	< 3	.5 \pm 0.2	.7 \pm 0.5
			3.0 - 4.0	< 2.3	< .5	< .9

Table E-4
(continued)

Page 3 of 3

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
1465	2128	HA093	1.5 - 2.0	< .2	< .5	< .9
			3.5 - 4.0	< 2.3	< .7	< 1
1470	2125	B3890R360	0.0 - 1.0	< 3.1	.6 \pm 0.1	2 \pm 0.1
			3.0 - 4.0	< 2.2	< .4	.7 \pm 0.1
1470	2142	B3890R354	0.0 - 1.0	< 4.7	< .8	1.3 \pm 0.8
			3.0 - 4.0	< 3.1	< .6	< .7
1471	2117	B3890R359	0.0 - 1.0	< 9.5	1.6 \pm 0.5	17.9 \pm 1.1
			3.0 - 4.0	< 3	< .6	< .9
1472	2103	HA097	1.5 - 2.0	< 4.2	< .6	< .8
			3.5 - 4.0	< 3.3	.4 \pm 0.3	< .8

Table E-5
Downhole Gamma Logging Results,
79 Avenue B

Page 1 of 4

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R362^d</u>			
1375	2101	0.5	8000
1375	2101	1.0	9000
1375	2101	1.5	8000
1375	2101	2.0	9000
1375	2101	2.5	9000
1375	2101	3.0	9000
1375	2101	3.5	9000
<u>Borehole B3890R363^d</u>			
1375	2125	0.5	7000
1375	2125	1.0	8000
1375	2125	1.5	8000
1375	2125	2.0	8000
1375	2125	2.5	8000
1375	2125	3.0	9000
1375	2125	3.5	8000
1375	2125	4.0	8000
1375	2125	4.5	8000
1375	2125	5.0	7000
1375	2125	5.5	8000
<u>Borehole B3890R361^d</u>			
1429	2102	0.5	10000
1429	2102	1.0	10000
1429	2102	1.5	9000
1429	2102	2.0	9000
1429	2102	2.5	10000
1429	2102	3.0	10000
1429	2102	3.5	8000
1429	2102	4.0	6000
1429	2102	4.5	6000
<u>Borehole B3890R357^d</u>			
1439	2115	0.5	6000
1439	2115	1.0	6000
1439	2115	1.5	7000
1439	2115	2.0	7000
1439	2115	2.5	7000

Table E-5
(continued)

Page 2 of 4

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R357^d</u> (continued)			
1439	2115	3.0	7000
1439	2115	3.5	8000
1439	2115	4.0	9000
1439	2115	4.5	9000
1439	2115	5.0	8000
1439	2115	5.5	6000
<u>Borehole B3890R356^d</u>			
1450	2102	0.5	9000
1450	2102	1.0	8000
1450	2102	1.5	9000
1450	2102	2.0	9000
1450	2102	2.5	8000
1450	2102	3.0	8000
1450	2102	3.5	8000
1450	2102	4.0	8000
1450	2102	4.5	9000
1450	2102	5.0	8000
<u>Borehole B3890R355^d</u>			
1450	2127	0.5	9900
1450	2127	1.0	10000
1450	2127	1.5	9200
1450	2127	2.0	8900
1450	2127	2.5	9100
1450	2127	3.0	9400
<u>Borehole B3890R358^d</u>			
1451	2117	0.5	9000
1451	2117	1.0	11000
1451	2117	1.5	14000
1451	2117	2.0	26000
1451	2117	2.5	15000
1451	2117	3.0	12000
1451	2117	3.5	11000
1451	2117	4.0	10000
1451	2117	4.5	10000
1451	2117	5.0	9000
1451	2117	5.5	10000

Table E-5
(continued)

Page 3 of 4

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R429</u>			
1457	2118	0.5	13000
1457	2118	1.0	11000
1457	2118	1.5	10000
1457	2118	2.0	10000
1457	2118	2.5	10000
1457	2118	3.0	10000
1457	2118	3.5	9000
1457	2118	4.0	8000
1457	2118	4.5	8000
1457	2118	5.0	8000
1457	2118	5.5	9000
1457	2118	6.0	8000
<u>Borehole B3890R428</u>			
1465	2122	0.5	12000
1465	2122	1.0	19000
1465	2122	1.5	14000
1465	2122	2.0	12000
1465	2122	2.5	12000
1465	2122	3.0	11000
1465	2122	3.5	10000
1465	2122	4.0	10000
<u>Borehole HA093</u>			
1465	2128	0.5	11000
1465	2128	1.0	11000
1465	2128	1.5	8000
1465	2128	2.0	9000
1465	2128	2.5	9000
1465	2128	3.0	9000
1465	2128	3.5	9000
1465	2128	4.0	10000
<u>Borehole B3890R360^d</u>			
1470	2125	0.5	9000
1470	2125	1.0	13000
1470	2125	1.5	11000

Table E-5
(continued)

Page 4 of 4

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R360^d</u> (continued)			
1470	2125	2.0	10000
1470	2125	2.5	9000
1470	2125	3.0	9000
1470	2125	3.5	9000
<u>Borehole B3890R359^d</u>			
1471	2117	0.5	72000
1471	2117	1.0	82000
1471	2117	1.5	44000
1471	2117	2.0	27000
1471	2117	2.5	22000
1471	2117	3.0	16000
1471	2117	3.5	12000
<u>Borehole HA097</u>			
1472	2103	0.5	14000
1472	2103	1.0	13000
1472	2103	1.5	11000
1472	2103	2.0	11000
1472	2103	2.5	11000
1472	2103	3.0	10000
1472	2103	3.5	9000
1472	2103	4.0	9000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table E-6
Gamma Radiation Exposure Rates,
79 Avenue B

Coordinates ^a		Rate ^b (μ R/h)
East	North	
1380	2130	6
1430	2130	7
1460	2130	8

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table E-7
Surface and Subsurface Radionuclide Concentrations in Soil,
90 Avenue C

Page 1 of 4

<u>Coordinates</u>		<u>Borehole No.</u>	<u>Depth (ft)</u>	<u>Concentration (pCi/g \pm 2 sigma)</u>		
<u>East</u>	<u>North</u>			<u>Uranium-238</u>	<u>Radium-226</u>	<u>Thorium-232</u>
Surface						
1476	2087		0.0 - 0.5	< 2.9	.5 \pm 0.3	1 \pm 0.3
1476	2096		0.0 - 0.5	< 5.2	.6 \pm 0.3	2.1 \pm 0.3
1476	2105		0.0 - 0.5	< 11.6	2.5 \pm 0.5	26.1 \pm 0.1
1480	2106		0.0 - 0.5	< 4.5	1.6 \pm 0.4	17 \pm 1
1482	2083		0.0 - 0.5	< 5.6	.8 \pm 0.4	3.2 \pm 0.4
1490	2110		0.0 - 0.5	< 8.4	1.9 \pm 1.0	5.1 \pm 1.9
1493	2083		0.0 - 0.5	< 7.2	.8 \pm 0.4	3.5 \pm 0.4
1495	2110		0.0 - 0.5	< 10	< 1.0	5.6 \pm 0.4
1500	2115		0.0 - 0.5	< 6.7	1.1 \pm 0.6	6.2 \pm 1.3
1505	2100		0.0 - 0.5	< 9.2	1.4 \pm 0.8	4.8 \pm 1.2
1505	2110		0.0 - 0.5	< 9.8	1.5 \pm 0.9	5.7 \pm 1.5
1510	2100		0.0 - 0.5	< 8.8	1.2 \pm 0.6	4.8 \pm 1.2
1510	2102		0.0 - 0.5	< 6.1	1.2 \pm 0.7	3.9 \pm 1.2
1510	2115		0.0 - 0.5	< 9.1	.9 \pm 0.7	3.6 \pm 1.1
1570	2110		0.0 - 0.5	< 7.2	< .5	1.5 \pm 0.9
1574	2095		0.0 - 0.5	< 6.7	< 1	< 1.5

Table E-7
(continued)

Page 2 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
1476	2105	None	0.5 - 1.0	< 11.1	2.2 \pm 1.2	30.9 \pm 1.3
			1.0 - 1.5	< 12.4	< 1.6	32.2 \pm 3.0
			1.5 - 2.0	< 9.9	< 1.5	18.1 \pm 1.3
			2.0 - 2.5	< 7.4	1.6 \pm 0.4	12.2 \pm 1.3
1478	2103	B3890R344	0.0 - 1.0	< 7.8	.8 \pm 0.6	9.6 \pm 0.6
			1.0 - 2.0	< 35.3	4.1 \pm 0.2	72.5 \pm 9.8
			2.0 - 3.0	< 7.7	1.6 \pm 0.6	3.6 \pm 0.5
			5.0 - 6.0	< 2.6	< .5	< .6
1479	2110	B3890R343	0.0 - 1.0	< 6.8	1.3 \pm 0.3	3.5 \pm 0.3
			2.0 - 3.0	< 1.6	< .5	< .7
			5.0 - 6.0	< 4.7	.5 \pm 0.1	.6 \pm 0.1
1497	2114	B3890R345	0.0 - 1.0	< 8.9	< 1.5	5.6 \pm 1.4
			2.0 - 3.0	< 3.1	< .6	< .8
			5.0 - 6.0	< 2.8	.6 \pm 0.1	.6 \pm 0.5
1500	2085	B3890R427	0.0 - 1.0	< 13.6	4.2 \pm 0.6	35.5 \pm 7.8
			1.0 - 2.0	< 1.9	.6 \pm 0.3	1 \pm 0.4
			2.0 - 3.0	< 10	.6 \pm 0.3	.7 \pm 0.4
			3.0 - 4.0	< 3.6	.4 \pm 0.2	.6 \pm 0.3
			4.0 - 5.0	< 3.1	.8 \pm 0.3	.7 \pm 0.3
			5.0 - 6.0	< 2.6	< .5	< .8
1500	2100	B3890R346	0.0 - 1.0	< 7.5	.7 \pm 0.2	2.4 \pm 0.2
			1.0 - 2.0	< 3.6	< .7	< .9
			2.0 - 3.0	< 3.3	< .7	< .8
			9.0 - 10.0	< 3.4	< .7	< .9
1501	2105	B3890R426	0.0 - 1.0	< 6.1	.9 \pm 0.5	2.9 \pm 0.7

Table E-7
(continued)

Page 3 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
1512	2092	B3890R348	0.0 - 1.0	< 3.8	< .7	1.4 \pm 0.3
			2.0 - 3.0	< 2.5	< .5	< .6
			5.0 - 6.0	< 2.9	< .5	< .7
1528	2088	B3890R349	0.0 - 1.0	< 6	1.7 \pm 1.0	2.7 \pm 1.0
			3.0 - 4.0	< 2.5	< .5	< .7
1558	2089	B3890R350	0.0 - 1.0	< 3.3	.7 \pm 0.2	1 \pm 0.3
			3.0 - 4.0	< 2.6	< .5	< .6
1568	2114	B3890R337	0.0 - 1.0	< 2.5	.7 \pm 0.3	1.3 \pm 0.7
			3.0 - 4.0	< 5.4	.6 \pm 0.2	.9 \pm 0.4
			5.0 - 6.0	< 2.7	< .5	1 \pm 0.5
1574	2095	HA113	1.5 - 2.0	< 3	< .5	.7 \pm 0.3
			2.5 - 3.0	< 3.4	< .5	< .6
1582	2098	B3890R351	0.0 - 1.0	< 4.5	< .8	1.6 \pm 0.3
			1.0 - 2.0	< 7.4	1.5 \pm 0.5	8.3 \pm 1.9
			5.0 - 6.0	< 2.7	< .5	< .6
1592	2105	B3890R436	0.0 - 2.0	< 3.2	< .6	< .9
			2.0 - 3.0	< 4.4	1 \pm 0.1	< 1
Basement Wall Sample						
Upper NE Corner			< 30.4	< 4.5	60 \pm 10	
Beneath Garage Floor Samples						
Location 1			0.0 - 0.5	< 3.0	< .8	< 1.0
			0.5 - 2.5	< 2.4	< .6	< .8
			2.5 - 5.0	< 2.2	< .5	< .7
Location 2			0.0 - 0.5	< 3.1	< .7 \pm .4	1.0 \pm 0.4
			0.5 - 2.5	< 2.3	< .5	< .6
			2.5 - 5.0	< 2.5	< .5 \pm .4	< .8

Ta E-7
(continued)

Page 4 of 4

Coordinates		Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North		Uranium-238	Radium-226	Thorium-232
Beneath Garage Floor Samples (cont'd)					
Location 3		0.0 - 0.5	< 3.2	< .8	< 1.4 \pm 0.7
		0.5 - 2.0	< 2.1	< .5	< .7
		2.0 - 5.0	< 2.6	< .5	< .7
Location 4		0.0 - 0.5	< 5.5	< 1.0	< 4.7 \pm 2.3
		0.5 - 1.0	< 3.8	< .8	< 2.2 \pm 0.5

Table E-8
Downhole Gamma Logging Results,
90 Avenue C

Page 1 of 5

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R344^d</u>			
1478	2103	0.5	83000
1478	2103	1.0	184000
1478	2103	1.5	94000
1478	2103	2.0	44000
1478	2103	2.5	36000
1478	2103	3.0	26000
1478	2103	3.5	19000
1478	2103	4.0	12000
1478	2103	4.5	10000
1478	2103	5.0	9000
<u>Borehole B3890R343^d</u>			
1479	2110	0.5	16000
1479	2110	1.0	21000
1479	2110	1.5	20000
1479	2110	2.0	15000
1479	2110	2.5	10000
1479	2110	3.0	9000
1479	2110	3.5	9000
1479	2110	4.0	9000
1479	2110	4.5	9000
1479	2110	5.0	9000
1479	2110	5.5	10000
<u>Borehole B3890C352^d</u>			
1482	2103	0.5	11000
1482	2103	1.0	20000
1482	2103	1.5	15000
1482	2103	2.0	9000
1482	2103	2.5	10000
1482	2103	3.0	9000
<u>Borehole B3890R345^d</u>			
1497	2114	0.5	13000
1497	2114	1.0	19000
1497	2114	1.5	15000
1497	2114	2.0	12000
1497	2114	2.5	10000

Table E-8
(continued)

Page 2 of 5

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R345^d</u> (continued)			
1497	2114	3.0	9000
1497	2114	3.5	10000
1497	2114	4.0	9000
1497	2114	4.5	9000
1497	2114	5.0	9000
1497	2114	5.5	9000
<u>Borehole B3890R427^d</u>			
1500	2085	0.5	16000
1500	2085	1.0	30000
1500	2085	1.5	42000
1500	2085	2.0	42000
1500	2085	2.5	16000
1500	2085	3.0	10000
1500	2085	3.5	9000
1500	2085	4.0	10000
1500	2085	4.5	11000
1500	2085	5.0	10000
1500	2085	5.5	11000
1500	2085	6.0	14000
<u>Borehole B3890R346^d</u>			
1500	2100	0.5	13000
1500	2100	1.0	39000
1500	2100	1.5	30000
1500	2100	2.0	11000
1500	2100	2.5	10000
1500	2100	3.0	10000
1500	2100	3.5	9000
1500	2100	4.0	9000
1500	2100	4.5	9000
1500	2100	5.0	7000
1500	2100	5.5	7000
1500	2100	6.0	9000
1500	2100	6.5	10000
1500	2100	7.0	10000
1500	2100	7.5	11000

Table E-8
(continued)

Page 3 of 5

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R426</u>			
1501	2105	0.5	17000
1501	2105	1.0	11000
1501	2105	1.5	11000
1501	2105	2.0	15000
1501	2105	2.5	10000
1501	2105	3.0	10000
1501	2105	3.5	10000
1501	2105	4.0	10000
1501	2105	4.5	11000
1501	2105	5.0	11000
1501	2105	5.5	10000
1501	2105	6.0	9000
1501	2105	6.5	10000
1501	2105	7.0	10000
1501	2105	7.5	10000
1501	2105	8.0	3000
<u>Borehole B3890R348^d</u>			
1512	2092	0.5	19000
1512	2092	1.0	22000
1512	2092	1.5	20000
1512	2092	2.0	14000
1512	2092	2.5	11000
1512	2092	3.0	9000
1512	2092	3.5	9000
1512	2092	4.0	9000
1512	2092	4.5	9000
1512	2092	5.0	9000
1512	2092	5.5	9000
<u>Borehole B3890R349^d</u>			
1528	2088	0.5	12000
1528	2088	1.0	15000
1528	2088	1.5	11000
1528	2088	2.0	10000
1528	2088	2.5	9000
1528	2088	3.0	9000
1528	2088	3.5	9000

Table E-8
(continued)

Page 4 of 5

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R337^d</u>			
1568	2114	0.5	7000
1568	2114	1.0	11000
1568	2114	1.5	10000
1568	2114	2.0	10000
1568	2114	2.5	9000
1568	2114	3.0	10000
1568	2114	3.5	10000
1568	2114	4.0	10000
1568	2114	4.5	10000
1568	2114	5.0	10000
1568	2114	5.5	10000
<u>Borehole HA113</u>			
1574	2095	0.5	7000
1574	2095	1.0	6000
1574	2095	1.5	6000
1574	2095	2.0	6000
1574	2095	2.5	7000
1574	2095	3.0	6000
<u>Borehole B3890R351^d</u>			
1582	2098	0.5	37000
1582	2098	1.0	24000
1582	2098	1.5	17000
1582	2098	2.0	12000
1582	2098	2.5	11000
1582	2098	3.0	13000
1582	2098	3.5	14000
1582	2098	4.0	11000
1582	2098	4.5	10000

Table E-8
(continued)

Page 5 of 5

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<hr/>			
<u>Borehole B3890R436</u>			
1592	2105	0.5	6000
1592	2105	1.0	7000
1592	2105	1.5	8000
1592	2105	2.0	8000
1592	2105	2.5	7000
1592	2105	3.0	7000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table E-9
Gamma Radiation Exposure Rates,
90 Avenue C

<u>Coordinates^a</u>		Rate ^b (μ R/h)
East	North	
1480	2110	20
1510	2090	17
1570	2100	9

Interior of Residence

Center of kitchen (1 m above floor)	38
Center of basement addition (1 m above floor)	36

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table E-10
Surface and Subsurface Radionuclide Concentrations in Soil,
108 Avenue E

Page 1 of 2

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
1982	2087		0.0 - 0.5	4.4 \pm 4.3	< 1	5.6 \pm 1.1
1986	2098		0.0 - 0.5	< 4.6	< 9	< 1.3
1995	2090		0.0 - 0.5	< 5.7	.9 \pm 0.3	1.1 \pm 0.6
1999	2088		0.0 - 0.5	< 4	< .9	< 1.2
2005	2060		0.0 - 0.5	< 6.5	1.2 \pm 0.9	2 \pm 0.9
2065	2100		0.0 - 0.5	< 7.8	.7 \pm 0.6	1.6 \pm 0.8
2073	2062		0.0 - 0.5	27 \pm 11	4 \pm 0.8	19 \pm 2
2075	2080		0.0 - 0.5	< 4.6	< .7	< 1.5
Subsurface						
1985	2078	B3890R304	0.0 - 1.0	< 5.3	1 \pm 0.6	< 1.1
			3.0 - 4.0	< 4.4	.6 \pm 0.4	1 \pm 0.5
			5.0 - 6.0	< 3	.8 \pm 0.3	.4 \pm 0.3
1991	2093	B3890R308	0.0 - 1.0	< 3.7	.6 \pm 0.4	.4 \pm 0.3
			3.0 - 4.0	< 5.5	.9 \pm 0.4	.7 \pm 0.6
			5.0 - 6.0	< 2.1	.6 \pm 0.3	.6 \pm 0.5
1999	2083	B3890R307	0.0 - 1.0	< 2.7	.7 \pm 0.5	1 \pm 0.8
			3.0 - 4.0	3 \pm 2.7	.5 \pm 0.3	< .3
			5.0 - 6.0	< 1.8	< .3	.4 \pm 0.4
2000	2075	B3890R303	0.0 - 1.0	< 5.3	1.1 \pm 1.1	1.4 \pm 0.6
			3.0 - 4.0	< 5.9	.6 \pm 0.5	< .7
			7.0 - 8.0	< 3.5	.7 \pm 0.3	< .6
2017	2060	B3890R302	0.0 - 1.0	< 4.2	.6 \pm 0.4	< .8
			5.0 - 6.0	< 3.8	.5 \pm 0.3	.7 \pm 0.4
			11.0 - 12.0	< 4.6	.9 \pm 0.5	< .6

E-24

Table E-10
(continued)

Page 2 of 2

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
2020	2100	B3890R306	0.0 - 1.0	< 4.4	.6 \pm 0.5	2.4 \pm 0.8
			3.0 - 4.0	< 3.1	.4 \pm 0.3	.3 \pm 0.3
			5.0 - 6.0	< 3.5	.4 \pm 0.2	.9 \pm 0.5
2069	2064	B3890R311	0.0 - 1.0	< 5.3	1.2 \pm 0.6	2 \pm 0.7
			3.0 - 4.0	< 3.5	.9 \pm 0.7	1.3 \pm 0.9
			5.0 - 6.0	< 7.5	.9 \pm 0.4	.8 \pm 0.7
2075	2100	B3890R309	0.0 - 1.0	< 3.9	.8 \pm 0.3	1.2 \pm 0.5
			3.0 - 4.0	< 5.4	.7 \pm 0.3	.8 \pm 0.5
			5.0 - 6.0	< 2.3	.6 \pm 0.3	< .5
2076	2062	B3890R312	0.0 - 1.0	14 \pm 11	2.8 \pm 0.9	13 \pm 2
			1.0 - 2.0	< 3.7	< .4	.8 \pm 0.4
			3.0 - 4.0	< 7.3	.8 \pm 0.4	.9 \pm 0.5
			5.0 - 6.0	< 6.1	.8 \pm 0.3	.7 \pm 0.4
2076	2078	B3890R310	0.0 - 1.0	< 7.2	1.2 \pm 0.5	3.8 \pm 0.9
			3.0 - 4.0	3.5 \pm 2.7	.5 \pm 0.3	.8 \pm 0.4
			5.0 - 6.0	< 3.2	.6 \pm 0.4	.6 \pm 0.4
2085	2058	B3890R313	0.0 - 1.0	< 4.5	.7 \pm 0.3	.9 \pm 0.6
			1.0 - 2.0	< 4.6	.7 \pm 0.1	.8 \pm 0.4
			2.0 - 3.0	< 2.9	.9 \pm 0.4	.5 \pm 0.4
			3.0 - 4.0	< 3.8	.9 \pm 0.3	.8 \pm 0.5
			4.0 - 5.0	< 5.3	.9 \pm 0.4	1.7 \pm 0.5
2092	2074	B3890R434	0.0 - 2.0	< 3.5	< .6	< .7
			3.0 - 4.0	< 3.3	.7 \pm 0.4	< .8
			5.0 - 6.0	< 2.6	.4 \pm 0.2	< .6

E-25

Table E-11
Downhole Gamma Logging Results
for 108 Avenue E

Page 1 of 4

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R305^d</u>			
1985	2077	0.5	8000
1985	2077	1.0	9000
<u>Borehole B3890R304^d</u>			
1985	2078	0.5	8000
1985	2078	1.0	9000
1985	2078	1.5	9000
1985	2078	2.0	10000
1985	2078	2.5	10000
1985	2078	3.0	9000
1985	2078	3.5	9000
1985	2078	4.0	9000
1985	2078	4.5	9000
1985	2078	5.0	9000
<u>Borehole B3890R308^d</u>			
1991	2093	0.5	7000
1991	2093	1.0	10000
1991	2093	1.5	10000
1991	2093	2.0	9000
1991	2093	2.5	9000
1991	2093	3.0	10000
1991	2093	3.5	10000
1991	2093	4.0	10000
1991	2093	4.5	9000
1991	2093	5.0	8000
1991	2093	5.5	8000
<u>Borehole B3890R307^d</u>			
1999	2083	0.5	9000
1999	2083	1.0	10000
1999	2083	1.5	10000
1999	2083	2.0	9000
1999	2083	2.5	9000
1999	2083	3.0	8000
1999	2083	3.5	8000
1999	2083	4.0	8000

Table E-11
(continued)

Page 2 of 4

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R303^d</u>			
2000	2075	0.5	6000
2000	2075	1.0	7000
2000	2075	1.5	7000
2000	2075	2.0	9000
2000	2075	2.5	11000
2000	2075	3.0	11000
2000	2075	3.5	9000
2000	2075	4.0	10000
2000	2075	4.5	9000
2000	2075	5.0	9000
2000	2075	5.5	10000
2000	2075	6.0	9000
2000	2075	6.5	9000
2000	2075	7.0	8000
<u>Borehole B3890R302^d</u>			
2017	2060	0.5	12000
2017	2060	1.0	11000
2017	2060	1.5	11000
2017	2060	2.0	10000
2017	2060	2.5	9000
2017	2060	3.0	9000
2017	2060	3.5	9000
2017	2060	4.0	9000
2017	2060	4.5	9000
2017	2060	5.0	9000
2017	2060	5.5	9000
2017	2060	6.0	10000
2017	2060	6.5	11000
2017	2060	7.0	10000
2017	2060	7.5	10000
2017	2060	8.0	10000
2017	2060	8.5	10000
2017	2060	9.0	9000
2017	2060	9.5	9000
2017	2060	10.0	8000
<u>Borehole B3890R306^d</u>			
2020	2100	0.5	11000
2020	2100	1.0	11000
2020	2100	1.5	10000

Table E-11
(continued)

Page 3 of 4

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R306^d</u> (continued)			
2020	2100	2.0	9000
2020	2100	2.5	9000
2020	2100	3.0	8000
2020	2100	3.5	8000
2020	2100	4.0	9000
2020	2100	4.5	9000
2020	2100	5.0	9000
<u>Borehole B3890R311^d</u>			
2069	2064	0.5	9000
2069	2064	1.0	11000
2069	2064	1.5	10000
2069	2064	2.0	9000
2069	2064	2.5	9000
2069	2064	3.0	10000
2069	2064	3.5	10000
2069	2064	4.0	10000
2069	2064	4.5	10000
2069	2064	5.0	10000
<u>Borehole B3890R309^d</u>			
2075	2100	0.5	8000
2075	2100	1.0	10000
2075	2100	1.5	11000
2075	2100	2.0	11000
2075	2100	2.5	11000
2075	2100	3.0	10000
2075	2100	3.5	10000
2075	2100	4.0	9000
2075	2100	4.5	10000
2075	2100	5.0	10000
<u>Borehole B3890R312^d</u>			
2076	2062	0.5	25000
2076	2062	1.0	42000
2076	2062	1.5	21000
2076	2062	2.0	12000
2076	2062	2.5	10000
2076	2062	3.0	10000
2076	2062	3.5	10000

Table E-11
(continued)

Page 4 of 4

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R312^d</u> (continued)			
2076	2062	4.0	10000
2076	2062	4.5	10000
2076	2062	5.0	9000
<u>Borehole B3890R310</u>			
2076	2078	0.5	13000
2076	2078	1.0	10000
2076	2078	1.5	11000
2076	2078	2.0	10000
2076	2078	2.5	11000
2076	2078	3.0	11000
2076	2078	3.5	11000
2076	2078	4.0	11000
2076	2078	4.5	10000
2076	2078	5.0	11000
2076	2078	5.5	11000
2076	2078	6.0	10000
<u>Borehole B3890R434</u>			
2092	2074	0.5	11000
2092	2074	1.0	13000
2092	2074	1.5	9000
2092	2074	2.0	9000
2092	2074	2.5	9000
2092	2074	3.0	9000
2092	2074	3.5	9000
2092	2074	4.0	9000
2092	2074	4.5	9000
2092	2074	5.0	9000
2092	2074	5.5	9000
2092	2074	6.0	8000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table E-12
Gamma Radiation Exposure Rates,
108 Avenue E

<u>Coordinates^a</u>		<u>Rate^b</u>
East	North	(μ R/h)
1995	2080	6
2035	2060	7
2075	2080	10

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table E-13
Surface and Subsurface Radionuclide Concentrations in Soil,
112 Avenue E

Page 1 of 4

<u>Coordinates</u>		<u>Borehole No.</u>	<u>Depth (ft)</u>	<u>Concentration (pCi/g \pm 2 sigma)</u>		
<u>East</u>	<u>North</u>			<u>Uranium-238</u>	<u>Radium-226</u>	<u>Thorium-232</u>
Surface						
1985	2005		0.0 - 0.5	< 6.4	< .6	1.3 \pm 0.8
1990	2030		0.0 - 0.5	< 2.6	.5 \pm 0.2	.6 \pm 0.3
2005	2045		0.0 - 0.5	17 \pm 10	3.7 \pm 0.8	22 \pm 2
2009	2046		0.0 - 0.5	< 12	2.6 \pm 0.9	16 \pm 2
2017	2048		0.0 - 0.5	< 6.7	3.1 \pm 0.9	20 \pm 2
2018	2013		0.0 - 0.5	< 5.7	1.5 \pm 0.4	6.7 \pm 0.8
2019	2024		0.0 - 0.5	< 4.7	1 \pm 0.4	1.6 \pm 0.6
2030	2005		0.0 - 0.5	< 3.6	1.3 \pm 0.5	6.3 \pm 0.9
2048	2005		0.0 - 0.5	< 9.5	3.2 \pm 1.0	18 \pm 2
2049	2032		0.0 - 0.5	< 16	4.4 \pm 0.9	34 \pm 2
2054	2019		0.0 - 0.5	< 6.3	2.7 \pm 0.9	16 \pm 1
2055	2021		0.0 - 0.5	12 \pm 6	2.7 \pm 0.6	15 \pm 1
2065	2055		0.0 - 0.5	11 \pm 7	2.4 \pm 0.6	12 \pm 1
2075	2015		0.0 - 0.5	5.2 \pm 3.0	1.6 \pm 0.5	9 \pm 0.9
2075	2035		0.0 - 0.5	< 8.4	1.4 \pm 0.6	2.4 \pm 0.8
Subsurface						
1986	2007	B3890R322	0.0 - 1.0	< 4.3	.8 \pm 0.4	.8 \pm 0.5
			3.0 - 4.0	< 3.8	.4 \pm 0.4	1 \pm 0.5
			5.0 - 6.0	< 5.5	.6 \pm 0.4	.5 \pm 0.5

Table E-13
(continued)

Page 2 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
1986	2020	B3890R321	0.0 - 1.0	3.2 \pm 3.0	.6 \pm 0.3	.9 \pm 0.4
			3.0 - 4.0	< 3.1	.4 \pm 0.3	.7 \pm 0.4
			5.0 - 6.0	< 2.8	< .2	.4 \pm 0.3
1993	2036	B3890R320	0.0 - 1.0	< 3	.6 \pm 0.4	.7 \pm 0.6
			3.0 - 4.0	< 3.2	.8 \pm 0.4	.7 \pm 0.6
			5.0 - 6.0	< 4.5	.6 \pm 0.3	.7 \pm 0.4
2000	2050	B3890R319	0.0 - 1.0	< 4.3	.7 \pm 0.4	1.2 \pm 0.5
			3.0 - 4.0	< 3.5	.5 \pm 0.3	.8 \pm 0.5
			5.0 - 6.0	< 5.3	.4 \pm 0.3	.8 \pm 0.4
2015	2035	B3890R324	0.0 - 1.0	1.5 \pm 1.3	.7 \pm 0.2	2 \pm 0.3
			3.0 - 4.0	< 2.2	.4 \pm 0.2	
			5.0 - 6.0	< 1.6	.6 \pm 0.3	.8 \pm 0.2
2015	2051	B3890R323	0.0 - 1.0	< 3.5	.5 \pm 0.2	.6 \pm 0.2
			3.0 - 4.0	< 4.5	.8 \pm 0.3	.8 \pm 0.1
			5.0 - 6.0	< 2.9	.6 \pm 0.2	1.1 \pm 0.7
2016	2010	B3890R326	0.0 - 1.0	< 4.4	.6 \pm 0.2	.9 \pm 0.1
			3.0 - 4.0	< 1	.4 \pm 0.1	.5 \pm 0.1
			4.0 - 5.0	< 1.1	.4 \pm 0.1	.7 \pm 0.3
			5.0 - 6.0	< 1.1	.4 \pm 0.1	.6 \pm 0.2
2016	2018	B3890R325	0.0 - 1.0	4.5 \pm 2.7	.9 \pm 0.2	3.5 \pm 0.6
			3.0 - 4.0	< 1.7	.5 \pm 0.2	.7 \pm 0.1
			5.0 - 6.0	< 1.2	< .3	.6 \pm 0.2
2017	2048	AS094	0.5 - 1.0	5.7 \pm 4.4	1 \pm 0.3	3.1 \pm 0.6
			2.0 - 2.5	< 4.6	.8 \pm 0.2	.8 \pm 0.4
			3.5 - 4.0	< 3.2	.5 \pm 0.2	.8 \pm 0.4
2018	2013	AS089	0.5 - 1.0	< 3.9	.5 \pm 0.3	.6 \pm 0.2
			2.0 - 2.5	5.9 \pm 2.9	1 \pm 0.3	2.3 \pm 0.6

Table E-13
(continued)

Page 3 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
2019	2024	AS090	0.5 - 1.0	22 \pm 7	3.1 \pm 0.6	15 \pm 1
			3.5 - 4.0	11 \pm 7	2 \pm 0.7	17 \pm 1
2041	1995	B3890R396	0.0 - 1.0	< 2.3	.7 \pm 0.3	1.1 \pm 0.4
			5.0 - 6.0	< 1.9	.6 \pm 0.2	.4 \pm 0.4
			11.0 - 12.0	< 1.0	.6 \pm 0.3	< 0.3
2049	2032	AS096	0.5 - 1.0	< 4.5	.7 \pm 0.3	4.3 \pm 0.6
			1.0 - 1.5	< 2.7	.9 \pm 0.3	1.4 \pm 0.5
			1.5 - 2.0	< 5.3	.8 \pm 0.3	1.3 \pm 0.5
			3.5 - 4.0	< 2.9	.5 \pm 0.2	.6 \pm 0.4
2051	2050	B3890R314	0.0 - 1.0	3.6 \pm 2.6	< .5	1.1 \pm 0.5
			1.0 - 2.0	< 3.3	< .5	< .7
			2.0 - 3.0	3.4 \pm 2.7	.8 \pm 0.2	.9 \pm 0.4
			3.0 - 4.0	< 2.8	.6 \pm 0.3	.9 \pm 0.3
			4.0 - 5.0	< 4	< .6	< .9
			5.0 - 6.0	< 5.4	.5 \pm 0.1	.7 \pm 0.1
2054	2019	AS095	0.5 - 1.0	5.8 \pm 3.2	1 \pm 0.5	3.9 \pm 0.7
			3.5 - 4.0	< 2.6	.4 \pm 0.2	.6 \pm 0.3
2058	2006	B3890R416	0.0 - 1.0	< 9.1	1.5 \pm 0.6	9.9 \pm 0.8
			1.0 - 2.0	< 3.8	< .6	1.4 \pm 0.4
			5.0 - 6.0	< 3.1	< .5	.9 \pm 0.2
			9.0 - 10.0	< 3.9	.8 \pm 0.4	< .7
2071	2009	B3890R317	0.0 - 1.0	< 10	1.3 \pm 0.8	12 \pm 2
			1.0 - 2.0	< 8.5	1 \pm 0.5	3.4 \pm 0.8
			5.0 - 6.0	< 3	.9 \pm 0.4	1.4 \pm 0.5
2074	2049	B3890R315	0.0 - 1.0	< 10	1.5 \pm 0.6	6.8 \pm 1.6
			4.0 - 5.0	< 3.8	.8 \pm 0.5	.9 \pm 0.5
			7.0 - 8.0	< 6.1	.8 \pm 0.4	.8 \pm 0.4

Table E-13
(continued)

Page 4 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
2075	2029	B3890R316	0.0 - 1.0	< 3.1	.8 \pm 0.5	< .9
			3.0 - 4.0	< 4.4	.6 \pm 0.3	.7 \pm 0.5
			5.0 - 6.0	< 3.2	.5 \pm 0.3	1 \pm
0.62085	2009	B3890R318	0.0 - 1.0	< 8.3	1 \pm 0.4	6.9 \pm 1.3
			1.0 - 2.0	5.6 \pm 4.2	.6 \pm 0.3	1.3 \pm 0.6
			5.0 - 6.0	< 2.2	.6 \pm 0.2	.7 \pm 0.3

Table E-14
Downhole Gamma Logging Results,
112 Avenue E

Page 1 of 6

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R322^d</u>			
1986	2007	0.5	7000
1986	2007	1.0	10000
1986	2007	1.5	10000
1986	2007	2.0	9000
1986	2007	2.5	10000
1986	2007	3.0	10000
1986	2007	3.5	11000
1986	2007	4.0	10000
<u>Borehole B3890R321^d</u>			
1986	2020	0.5	8000
1986	2020	1.0	9000
1986	2020	1.5	9000
1986	2020	2.0	8000
1986	2020	2.5	9000
1986	2020	3.0	9000
1986	2020	3.5	9000
1986	2020	4.0	9000
1986	2020	4.5	9000
1986	2020	5.0	8000
<u>Borehole B3890R320^d</u>			
1993	2036	0.5	7000
1993	2036	1.0	8000
1993	2036	1.5	8000
1993	2036	2.0	8000
1993	2036	2.5	8000
1993	2036	3.0	8000
1993	2036	3.5	9000
1993	2036	4.0	9000
1993	2036	4.5	9000
1993	2036	5.0	9000
<u>Borehole B3890R319^d</u>			
2000	2050	0.5	7000
2000	2050	1.0	9000
2000	2050	1.5	10000
2000	2050	2.0	10000

Table E-14

(continued)

Page 2 of 6

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R319^d</u> (continued)			
2000	2050	2.5	9000
2000	2050	3.0	9000
2000	2050	3.5	10000
2000	2050	4.0	10000
2000	2050	4.5	10000
2000	2050	5.0	10000
<u>Borehole B3890R324^d</u>			
2015	2035	0.5	9000
2015	2035	1.0	12000
2015	2035	1.5	10000
2015	2035	2.0	9000
2015	2035	2.5	10000
2015	2035	3.0	9000
2015	2035	3.5	9000
2015	2035	4.0	9000
2015	2035	4.5	9000
<u>Borehole B3890R323^d</u>			
2015	2051	0.5	9000
2015	2051	1.0	10000
2015	2051	1.5	9000
2015	2051	2.0	8000
2015	2051	2.5	8000
2015	2051	3.0	8000
2015	2051	3.5	9000
2015	2051	4.0	10000
2015	2051	4.5	10000
2015	2051	5.0	9000
<u>Borehole B3890R326^d</u>			
2016	2010	0.5	8000
2016	2010	1.0	10000
2016	2010	1.5	10000
2016	2010	2.0	9000
2016	2010	2.5	9000
2016	2010	3.0	9000
2016	2010	3.5	9000
2016	2010	4.0	10000

Table E-14
(continued)

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R325^d</u>			
2016	2018	0.5	11000
2016	2018	1.0	14000
2016	2018	1.5	10000
2016	2018	2.0	9000
2016	2018	2.5	8000
2016	2018	3.0	8000
2016	2018	3.5	9000
2016	2018	4.0	9000
2016	2018	4.5	9000
<u>Borehole AS094</u>			
2017	2048	0.5	31000
2017	2048	1.0	15000
2017	2048	1.5	9000
2017	2048	2.0	8000
2017	2048	2.5	7000
2017	2048	3.0	7000
2017	2048	3.5	7000
2017	2048	4.0	8000
<u>Borehole AS089^d</u>			
2018	2013	0.5	30000
2018	2013	1.0	18000
2018	2013	1.5	14000
2018	2013	2.0	9000
2018	2013	2.5	7700
<u>Borehole AS090</u>			
2019	2024	0.5	42000
2019	2024	1.0	27000
2019	2024	1.5	11000
2019	2024	2.0	8000
2019	2024	2.5	7000
2019	2024	3.0	7000
2019	2024	3.5	7000
2019	2024	4.0	7000

Table E-14
(continued)

Page 4 of 6

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R396^d</u>			
2041	1995	0.5	8000
2041	1995	1.0	10000
2041	1995	1.5	11000
2041	1995	2.0	11000
2041	1995	2.5	10000
2041	1995	3.0	9000
2041	1995	3.5	9000
2041	1995	4.0	10000
2041	1995	4.5	10000
2041	1995	5.0	10000
2041	1995	5.5	10000
2041	1995	6.0	9000
2041	1995	6.5	9000
2041	1995	7.0	8000
2041	1995	7.5	7000
2041	1995	8.0	7000
2041	1995	8.5	7000
2041	1995	9.0	7000
2041	1995	9.5	7000
2041	1995	10.0	8000
2041	1995	10.5	8000
2041	1995	11.0	8000
<u>Borehole AS096</u>			
2049	2032	0.5	55000
2049	2032	1.0	34000
2049	2032	1.5	11000
2049	2032	2.0	8000
2049	2032	2.5	7000
2049	2032	3.0	7000
2049	2032	3.5	7000
2049	2032	4.0	8000
<u>Borehole AS095</u>			
2054	2019	0.5	40000
2054	2019	1.0	22000
2054	2019	1.5	12000
2054	2019	2.0	9000
2054	2019	2.5	7000
2054	2019	3.0	7000
2054	2019	3.5	7000

Table E-14
(continued)

Page 5 of 6

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R416^d</u>			
2058	2006	0.5	34000
2058	2006	1.0	29000
2058	2006	1.5	20000
2058	2006	2.0	15000
2058	2006	2.5	13000
2058	2006	3.0	13000
2058	2006	3.5	12000
2058	2006	4.0	12000
2058	2006	4.5	11000
2058	2006	5.0	10000
2058	2006	5.5	11000
2058	2006	6.0	10000
2058	2006	6.5	11000
2058	2006	7.0	11000
2058	2006	7.5	11000
2058	2006	8.0	11000
2058	2006	8.5	9000
2058	2006	9.0	9000
2058	2006	9.5	9000
<u>Borehole B3890R317^d</u>			
2071	2009	0.5	25000
2071	2009	1.0	27000
2071	2009	1.5	16000
2071	2009	2.0	13000
2071	2009	2.5	12000
2071	2009	3.0	11000
2071	2009	3.5	11000
2071	2009	4.0	10000
2071	2009	4.5	10000
2071	2009	5.0	10000
2071	2009	5.5	12000
2071	2009	6.0	11000
<u>Borehole B3890R315^d</u>			
2074	2049	0.5	19000
2074	2049	1.0	14000
2074	2049	1.5	12000
2074	2049	2.0	12000
2074	2049	2.5	10000
2074	2049	3.0	10000

Table E-14
(continued)

Page 6 of 6

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R315^d</u> (continued)			
2074	2049	3.5	9000
2074	2049	4.0	9000
2074	2049	4.5	10000
2074	2049	5.0	10000
<u>Borehole B3890R316^d</u>			
2075	2029	0.5	10000
2075	2029	1.0	10000
2075	2029	1.5	10000
2075	2029	2.0	11000
2075	2029	2.5	10000
2075	2029	3.0	10000
2075	2029	3.5	9000
2075	2029	4.0	10000
2075	2029	4.5	11000
2075	2029	5.0	10000
<u>Borehole B3890R318^d</u>			
2085	2009	0.5	20000
2085	2009	1.0	27000
2085	2009	1.5	22000
2085	2009	2.0	16000
2085	2009	2.5	13000
2085	2009	3.0	12000
2085	2009	3.5	10000
2085	2009	4.0	10000
2085	2009	4.5	12000
2085	2009	5.0	12000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table E-15
Gamma Radiation Exposure Rates,
112 Avenue E

<u>Coordinates^a</u>		Rate ^b
East	North	(μ R/h)
1995	2025	17
2035	2005	9
2065	2025	21

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table E-16
Surface and Subsurface Radionuclide Concentrations in Soil,
113 Avenue E

Page 1 of 4

<u>Coordinates</u>		Borehole No.	Depth (ft)	<u>Concentration (pCi/g ± 2 sigma)</u>		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
2117	2050		0.0 - 0.5	< 9.9	.9 ± 0.2	5.1 ± 0.5
2120	2010		0.0 - 0.5	< 3.1	< .5	< .8
2120	2050		0.0 - 0.5	< 9.9	.9 ± 0.2	5.1 ± 0.5
2125	2020		0.0 - 0.5	12 ± 8	3.4 ± 0.5	2 ± 1.4
2125	2042		0.0 - 0.5	37 ± 27	3.7 ± 1.8	28 ± 3
2130	2030		0.0 - 0.5	< 5.7	.6 ± 0.2	1 ± 0.3
2134	2006		0.0 - 0.5	9.7 ± 4.2	.9 ± 0.4	5.9 ± 0.8
2140	2010		0.0 - 0.5	< 3.2	< .6	1.5 ± 0.5
2140	2050		0.0 - 0.5	< 2.7	.9 ± 0.4	1.1 ± 0.4
2150	2030		0.0 - 0.5	< 8.6	1.1 ± 0.2	4.7 ± 0.4
2153	2048		0.0 - 0.5	5.6 ± 4.7	1.4 ± 0.4	5.9 ± 1.0
2160	2010		0.0 - 0.5	< 2.7	.7 ± 0.3	.8 ± 0.5
2160	2050		0.0 - 0.5	< 2.6	< .5	.9 ± 0.4
2163	2048		0.0 - 0.5	< 8.9	1.4 ± 0.1	6.6 ± 0.4
2172	2007		0.0 - 0.5	11.1 ± 4.8	1.1 ± 0.5	6.8 ± 0.9
2179	2048		0.0 - 0.5	5.6 ± 3.6	< .8	4.5 ± 0.8
2180	2010		0.0 - 0.5	< 3.8	1.2 ± 0.4	2.1 ± 0.6
2180	2050		0.0 - 0.5	4.2 ± 0.3	1.1 ± 0.3	3.5 ± 0.6
2190	2030		0.0 - 0.5	< 2.6	< .5	.8 ± 0.4

Table E-16
(continued)

Page 2 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Surface (cont'd)						
2195	2045		0.0 - 0.5	< 5.1	1.1 \pm 0.7	5.1 \pm 0.8
2200	2010		0.0 - 0.5	6.1 \pm 3.4	< .6	2.4 \pm 0.5
2200	2050		0.0 - 0.5	< 4.2	< .7	2.9 \pm 0.6
2210	2030		0.0 - 0.5	< 2.3	< .5	.9 \pm 0.4
2220	2050		0.0 - 0.5	< 6.3	.7 \pm 0.2	1.2 \pm 0.3
Subsurface						
2104	2034	B3890R435	0.0 - 2.0	< 4.6	.5 \pm 0.3	.6 \pm 0.5
			4.0 - 5.0	< 3.1	.7 \pm 0.3	.9 \pm 0.3
			7.0 - 8.0	< 2.6	.5 \pm 0.2	.6 \pm 0.3
2117	2050	B3890R340	0.0 - 1.0	< 4.4	1.7 \pm 0.3	6.8 \pm 1.6
			1.0 - 2.0	< 2.5	< .7	3.3 \pm 0.7
			7.0 - 8.0	< 1.6	< .5	.7 \pm 0.3
2119	2009	B3890R327	0.0 - 1.0	< 1.7	.7 \pm 0.1	1 \pm 0.3
			3.0 - 4.0	< 1.1	.5 \pm 0.1	.7 \pm 0.4
			4.0 - 5.0	< 2.9	.4 \pm 0.1	.6 \pm 0.1
2140	2005	B3890C364	0.0 - 1.0	< 1.3	.5 \pm 0.3	1 \pm 0.3
			1.0 - 2.0	1.9 \pm 2.2	1.2 \pm 0.5	5.7 \pm 0.7
			2.0 - 3.0	< 1.3	.5 \pm 0.1	.8 \pm 0.2
			5.0 - 6.0	< 2.6	.4 \pm 0.2	.5 \pm 0.1
2141	1996	B3890R341	0.0 - 1.0	< 2.3	< .6	1.7 \pm 0.3
			4.0 - 5.0	< 1.7	< .6	.7 \pm 0.5
			7.0 - 8.0	< 1.4	< .5	< .7
2141	2015	B3890433	0.0 - 2.0	< 2.9	< .8	< 1.2
			3.0 - 4.0	< 2.2	< .7	< 1
			5.0 - 6.0	< 1.9	< .6	.8 \pm 0.4

Table E-16
(continued)

Page 3 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
2150	2025	B3890R334	0.0 - 1.0	< 3.4	.9 \pm 0.6	< .8
			3.0 - 4.0	< 7.8	1.2 \pm 0.4	2.6 \pm 0.8
			5.0 - 6.0	< 3.1	.6 \pm 0.4	< .5
2150	2050	B3890R335	0.0 - 1.0	< 8.1	1.5 \pm 0.6	3.4 \pm 1.3
			2.0 - 3.0	< 2.5	.4 \pm 0.4	1. \pm 0.5
			5.0 - 6.0	< 3.2	.5 \pm 0.3	.5 \pm 0.3
2160	1997	B3890R373	0.0 - 1.0	< 3.3	< .7	1.6 \pm 0.1
			4.0 - 5.0	< 1.7	< .4	< .6
			8.0 - 9.0	< 3.4	.5 \pm 0.1	.5 \pm 0.2
			9.0 - 10.0	< 1.3	< .4	< .5
2170	2050	B3890R342	0.0 - 1.0	< 2.5	< .8	2.1 \pm 0.8
			3.0 - 4.0	< 1.4	< .5	.6 \pm 0.4
			5.0 - 6.0	< 1.7	< .5	< .9
2175	2050	B3890R329	0.0 - 2.0	< 7.2	1.2 \pm 0.6	6.1 \pm 1.1
			5.0 - 6.0	< 3.6	.3 \pm 0.3	.7 \pm 0.6
2181	2009	B3890R338	0.0 - 1.0	< 9.2	1.3 \pm 0.6	2.5 \pm 1.0
			3.0 - 4.0	< 3.7	.7	< .7
			5.0 - 6.0	< 4.2	.5 \pm 0.4	1.1 \pm 0.5
2193	2041	B3890R339	0.0 - 1.0	< 5.7	1.3 \pm 0.4	1.3 \pm 0.7
			3.0 - 4.0	< 6.4	.7 \pm 0.5	.9 \pm 0.6
			5.0 - 6.0	< 2.5	.8 \pm 0.4	.8 \pm 0.4
2193	2045	B3890R336	0.0 - 1.0	13 \pm 8	1.9 \pm 0.7	13 \pm 2
			1.0 - 2.0	< 6.4	.8 \pm 0.5	1.7 \pm 0.8
			5.0 - 6.0	< 3.2	.4 \pm 0.3	.5 \pm 0.5
2200	2025	B3890R333	0.0 - 1.0	< 4.5	.5 \pm 0.3	1. \pm 0.5
			3.0 - 4.0	< 2.4	.6 \pm 0.2	.6 \pm 0.2
			5.0 - 6.0	< 1.8	.5 \pm 0.2	.6 \pm 0.2

Table E-16
(continued)

Page 4 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)			
East	North			Uranium-238	Radium-226	Thorium-232	
Subsurface (cont'd)							
2200	2050	B3890R330	0.0 - 1.0	< 5.1		.7 \pm 0.4	.5 \pm 0.4
			3.0 - 4.0	< 2.9		.6 \pm 0.4	.8 \pm 0.7
			5.0 - 6.0	< 3.1		.6 \pm 0.3	< .4
2205	1997	B3890R374	0.0 - 1.0	< 1.9	<	.5	< .8
			4.0 - 5.0	< 3.5		.4 \pm 0.1	.5 \pm 0.1
			8.0 - 9.0	< 1.9		.4 \pm 0.2	< .5
			9.0 - 10.0	< 1.6	<	.3	.5 \pm 0.2
2215	2010	B3890R397	0.0 - 1.0	< 2.6		.5 \pm 0.3	1.4 \pm 0.2
			5.0 - 6.0	< 3.8		.5 \pm 0.3	.7 \pm 0.3
			10.0 - 12.0	< 1.8		.7 \pm 0.5	.6 \pm 0.3
2221	2048	B3890R331	0.0 - 1.0	< 2.1		.7 \pm 0.5	1.3 \pm 0.8
			3.0 - 4.0	< 4.5		.8 \pm 0.3	1.2 \pm 0.6
			5.0 - 6.0	< 3		.4 \pm 0.4	1 \pm 0.4
2224	2025	B3890R332	0.0 - 1.0	< 10		.6 \pm 0.5	1.3 \pm 0.8
			3.0 - 4.0	< 2.8		.5 \pm 0.2	< .4
			5.0 - 6.0	< 6.1	<	.5	< .7 \pm 0.4

E-45

Table E-17
Downhole Gamma Logging Results,
113 Avenue E

Page 1 of 8

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R435</u>			
2104	2034	0.5	10000
2104	2034	1.0	10000
2104	2034	1.5	10000
2104	2034	2.0	10000
2104	2034	2.5	10000
2104	2034	3.0	10000
2104	2034	3.5	12000
2104	2034	4.0	11000
2104	2034	4.5	11000
2104	2034	5.0	11000
2104	2034	5.5	11000
2104	2034	6.0	10000
2104	2034	6.5	9000
2104	2034	7.0	9000
2104	2034	7.5	9000
2104	2034	8.0	9000
<u>Borehole B3890R340^d</u>			
2117	2050	0.5	32000
2117	2050	1.0	31000
2117	2050	1.5	14000
2117	2050	2.0	10000
2117	2050	2.5	8000
2117	2050	3.0	9000
2117	2050	3.5	9000
2117	2050	4.0	10000
2117	2050	4.5	9000
2117	2050	5.0	9000
2117	2050	5.5	9000
2117	2050	6.0	10000
<u>Borehole B3890R327^d</u>			
2119	2009	0.5	8000
2119	2009	1.0	10000
2119	2009	1.5	10000
2119	2009	2.0	10000
2119	2009	2.5	10000
2119	2009	3.0	9000
2119	2009	3.5	9000

Table E-17
(continued)

Page 2 of 8

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R327^d</u> (continued)			
2119	2009	4.0	10000
2119	2009	4.5	11000
2119	2009	5.0	11000
<u>Borehole B3890C364^d</u>			
2140	2005	0.5	31000
2140	2005	1.0	27000
2140	2005	1.5	13000
2140	2005	2.0	11000
2140	2005	2.5	10000
2140	2005	3.0	10000
2140	2005	3.5	10000
2140	2005	4.0	9000
2140	2005	4.5	11000
<u>Borehole B3890R328^d</u>			
2140	2005	0.5	20000
2140	2005	1.0	30000
2140	2005	1.5	19000
2140	2005	2.0	13000
2140	2005	2.5	10000
2140	2005	3.0	10000
2140	2005	3.5	10000
2140	2005	4.0	10000
<u>Borehole B3890R341^d</u>			
2141	1996	0.5	10000
2141	1996	1.0	14000
2141	1996	1.5	13000
2141	1996	2.0	11000
2141	1996	2.5	10000
2141	1996	3.0	9000
2141	1996	3.5	9000
2141	1996	4.0	10000
2141	1996	4.5	10000
2141	1996	5.0	10000
2141	1996	5.5	10000
2141	1996	6.0	9000

Table E-17
(continued)

Page 3 of 8

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R433</u>			
2141	2015	0.5	8000
2141	2015	1.0	9000
2141	2015	1.5	10000
2141	2015	2.0	10000
2141	2015	2.5	10000
2141	2015	3.0	9000
2141	2015	3.5	9000
2141	2015	4.0	10000
2141	2015	4.5	10000
2141	2015	5.0	11000
2141	2015	5.5	10000
2141	2015	6.0	9000
<u>Borehole B3890R334^d</u>			
2150	2025	0.5	9000
2150	2025	1.0	12000
2150	2025	1.5	11000
2150	2025	2.0	11000
2150	2025	2.5	11000
2150	2025	3.0	9000
2150	2025	3.5	10000
2150	2025	4.0	9000
2150	2025	4.5	10000
2150	2025	5.0	9000
<u>Borehole B3890R335^d</u>			
2150	2050	0.5	7000
2150	2050	1.0	10000
2150	2050	1.5	10000
2150	2050	2.0	11000
2150	2050	2.5	11000
2150	2050	3.0	10000
2150	2050	3.5	10000
2150	2050	4.0	9000
2150	2050	4.5	9000
2150	2050	5.0	9000
2150	2050	5.5	9000

Table E-17
(continued)

Page 4 of 8

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R373^d</u>			
2160	1997	0.5	13000
2160	1997	1.0	15000
2160	1997	1.5	12000
2160	1997	2.0	16000
2160	1997	2.5	10000
2160	1997	3.0	10000
2160	1997	3.5	10000
2160	1997	4.0	11000
2160	1997	4.5	11000
2160	1997	5.0	11000
2160	1997	5.5	11000
2160	1997	6.0	10000
2160	1997	6.5	8000
2160	1997	7.0	8000
2160	1997	7.5	9000
2160	1997	8.0	10000
2160	1997	8.5	9000
<u>Borehole B3890R342^d</u>			
2170	2050	0.5	12000
2170	2050	1.0	11000
2170	2050	1.5	9000
2170	2050	2.0	9000
2170	2050	2.5	8000
2170	2050	3.0	8000
2170	2050	3.5	9000
2170	2050	4.0	8000
2170	2050	4.5	8000
2170	2050	5.0	8000
<u>Borehole B3890R329^d</u>			
2175	2050	0.5	24000
2175	2050	1.0	24000
2175	2050	1.5	15000
2175	2050	2.0	13000
2175	2050	2.5	10000
2175	2050	3.0	9000
2175	2050	3.5	9000
2175	2050	4.0	10000
2175	2050	4.5	10000

Table E-17
(continued)

Page 5 of 8

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R338^d</u>			
2181	2009	0.5	16000
2181	2009	1.0	12000
2181	2009	1.5	11000
2181	2009	2.0	11000
2181	2009	2.5	10000
2181	2009	3.0	9000
2181	2009	3.5	8000
2181	2009	4.0	10000
2181	2009	4.5	9000
<u>Borehole B3890R339^d</u>			
2193	2041	0.5	10000
2193	2041	1.0	11000
2193	2041	1.5	10000
2193	2041	2.0	10000
2193	2041	2.5	10000
2193	2041	3.0	11000
2193	2041	3.5	10000
2193	2041	4.0	10000
2193	2041	4.5	9000
<u>Borehole B3890R336^d</u>			
2193	2045	0.5	16000
2193	2045	1.0	11000
2193	2045	1.5	10000
2193	2045	2.0	10000
2193	2045	2.5	10000
2193	2045	3.0	10000
2193	2045	3.5	10000
2193	2045	4.0	10000
2193	2045	4.5	10000
<u>Borehole B3890R333^d</u>			
2200	2025	0.5	9000
2200	2025	1.0	10000
2200	2025	1.5	10000
2200	2025	2.0	9000

Table E-17
(continued)

Page 6 of 8

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R333^d</u> (continued)			
2200	2025	2.5	9000
2200	2025	3.0	8000
2200	2025	3.5	9000
2200	2025	4.0	10000
2200	2025	4.5	9000
<u>Borehole B3890R330^d</u>			
2200	2050	0.5	17000
2200	2050	1.0	21000
2200	2050	1.5	12000
2200	2050	2.0	10000
2200	2050	2.5	9000
2200	2050	3.0	9000
2200	2050	3.5	10000
2200	2050	4.0	11000
2200	2050	4.5	10000
<u>Borehole B3890R374^d</u>			
2210	1997	0.5	10000
2210	1997	1.0	11000
2210	1997	1.5	11000
2210	1997	2.0	11000
2210	1997	2.5	10000
2210	1997	3.0	11000
2210	1997	3.5	9000
2210	1997	4.0	9000
2210	1997	4.5	9000
2210	1997	5.0	9000
2210	1997	5.5	10000
2210	1997	6.0	9000
2210	1997	6.5	9000
2210	1997	7.0	9000
2210	1997	7.5	9000
2210	1997	8.0	11000
2210	1997	8.5	10000

Table E-17
(continued)

Page 7 of 8

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R397^d</u>			
2215	2010	0.5	9000
2215	2010	1.0	11000
2215	2010	1.5	11000
2215	2010	2.0	11000
2215	2010	2.5	11000
2215	2010	3.0	11000
2215	2010	3.5	9000
2215	2010	4.0	10000
2215	2010	4.5	10000
2215	2010	5.0	9000
2215	2010	5.5	8000
2215	2010	6.0	9000
2215	2010	6.5	9000
2215	2010	7.0	8000
2215	2010	7.5	8000
2215	2010	8.0	8000
2215	2010	8.5	8000
2215	2010	9.0	8000
2215	2010	9.5	9000
2215	2010	10.0	9000
2215	2010	10.5	8000
2215	2010	11.0	8000
2215	2010	11.5	7000
<u>Borehole B3890R331^d</u>			
2221	2048	0.5	12000
2221	2048	1.0	13000
2221	2048	1.5	12000
2221	2048	2.0	10000
2221	2048	2.5	10000
2221	2048	3.0	10000
2221	2048	3.5	11000
2221	2048	4.0	11000
2221	2048	4.5	10000
<u>Borehole B3890R332^d</u>			
2224	2025	0.5	8000
2224	2025	1.0	9000
2224	2025	1.5	9000
2224	2025	2.0	9000

Table E-17
(continued)

Page 8 of 8

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R332^d</u> (continued)			
2224	2025	2.5	9000
2224	2025	3.0	8000
2224	2025	3.5	8000
2224	2025	4.0	8000
2224	2025	4.5	7000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table E-18
Gamma Radiation Exposure Rates,
113 Avenue E

<u>Coordinates^a</u>		Rate ^b
East	North	(μ R/h)
2130	2010	14
2130	2040	9
2190	2010	12
2190	2040	12
2220	2030	8

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table E-19
Surface and Subsurface Radionuclide Concentrations in Soil,
62 Trudy Drive

Page 1 of 4

<u>Coordinates</u>		Borehole No.	Depth (ft)	<u>Concentration (pCi/g ± 2 sigma)</u>		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
2480	1850		0.0 - 0.5	< 7.9	1.5 ± 0.2	4.2 ± 0.3
2480	1853		0.0 - 0.5	< 3.8	.9 ± 0.2	< 1.5
2490	1850		0.0 - 0.5	< 5.2	.7 ± 0.2	1.4 ± 0.4
2490	1890		0.0 - 0.5	< 3.1	.9 ± 0.3	1.4 ± 0.5
2500	1847		0.0 - 0.5	< 2.7	.6 ± 0.4	2.2 ± 0.5
2500	1890		0.0 - 0.5	< 7.8	3.7 ± 0.2	12.7 ± 1.3
2500	1881		0.0 - 0.5	< 5.6	2.1 ± 0.9	6.8 ± 1.0
2510	1870		0.0 - 0.5	< 2	.6 ± 0.2	1.3 ± 0.3
2510	1880		0.0 - 0.5	< 4.8	1.9 ± 0.9	4.2 ± 0.8
2559	1889		0.0 - 0.5	< 9.5	1.9 ± 0.3	8.3 ± 0.6
2570	1890		0.0 - 0.5	3 ± 1.7	1.1 ± 0.5	2.5 ± 0.5
Subsurface						
2480	1853	HA126	2.0 - 2.5	< 3.7	.8 ± 0.5	1.5 ± 0.5
			3.5 - 4.0	< 3.8	< .8	1.8 ± 0.4
2487	1880	B3890R366	0.0 - 1.0	< 3.7	< .8	1.7 ± 0.7
			4.0 - 5.0	18.2 ± 6.4	10.8 ± 0.6	24.9 ± 3.5
			6.0 - 7.0	7 ± 4.4	3.6 ± 0.4	14.6 ± 1.8
			7.0 - 8.0	< 4.5	.5 ± 0.1	.7 ± 0.1
2493	1890	B3890R367	0.0 - 2.0	< 3.0	< .6	1.3 ± 0.4
			3.0 - 4.0	7.1 ± 5.1	3.8 ± 0.2	12 ± 1.5
			5.0 - 6.0	7.4 ± 3.3	2.1 ± 0.4	5.2 ± 1.6
			7.0 - 8.0	< 4.8	.9 ± 0.2	.8 ± 0.2
			8.0 - 9.0	2.5 ± 1.9	.8 ± 0.2	1 ± 0.5
			9.0 - 10.0	< 1.9	< .4	< .5

E-55

Table E-19

(continued)

Page 2 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
2500	1847	HA119	1.0 - 1.5	< 4.5	.9 \pm 0.3	1 \pm 0.4
			2.0 - 2.5	< 4.6	.8 \pm 0.2	.9 \pm 0.3
2500	1877	B3890R365	0.0 - 1.0	3.2 \pm 2.5	1.8 \pm 0.5	4.9 \pm 1.4
			1.0 - 2.0	< 9.9	2.4 \pm 0.2	7.6 \pm 0.6
			2.0 - 3.0	< 3.2	.8 \pm 0.1	2.1 \pm 0.6
			6.0 - 7.0	3.3 \pm 2.1	1.4 \pm 0.3	2.5 \pm 0.1
			7.0 - 8.0	< 1.8	.4 \pm 0.2	< .5
			8.0 - 9.0	< 6.3	1 \pm 0.2	2.4 \pm 0.4
2505	1847	B3890R371	9.0 - 10.0	< 1.8	.4 \pm 0.2	< .5
			0.0 - 1.0	< 4.4	.8 \pm 0.3	2.6 \pm 0.5
			1.0 - 2.0	< 7.8	1 \pm 0.2	3.1 \pm 0.2
			2.0 - 3.0	< 3	.8 \pm 0.3	.9 \pm 0.2
			8.0 - 9.0	< 2.3	.6 \pm 0.2	.8 \pm 0.2
2506	1892	B3890R368	9.0 - 10.0	< 2.6	.6 \pm 0.3	.7 \pm 0.5
			0.0 - 1.0	< 5	2.3 \pm 0.7	4.6 \pm 1.1
			4.0 - 5.0	< 2.3	.6 \pm 0.2	1.3 \pm 0.2
			7.0 - 8.0	< 5.1	1 \pm 0.1	1 \pm 0.2
			8.0 - 9.0	< 2.2	.4 \pm 0.2	< .6
2511	1871	B3890R369	9.0 - 10.0	< 1.8	.6 \pm 0.3	< .5
			0.0 - 1.0	< 9.8	1.5 \pm 0.2	4.7 \pm 0.4
			3.0 - 4.0	< 2.9	.8 \pm 0.4	< .8
			6.0 - 7.0	< 2.6	< .5	1.1 \pm 0.7
			7.0 - 8.0	< 2.2	< .5	.7 \pm 0.4
2529	1895	B3890R372	0.0 - 1.0	< 4.7	.9 \pm 0.3	2.3 \pm 1.1
			6.0 - 7.0	< 2.9	< .5	.8 \pm 0.4
			10.0 - 11.0	< 3.1	< .5	.7 \pm 0.4
			11.0 - 12.0	< 2.4	< .4	.7 \pm 0.6
2530	1847	B3890R370	0.0 - 1.0	< 4.3	.5 \pm 0.2	.8 \pm 0.2
			4.0 - 5.0	< 1.9	< .4	1 \pm 0.4
			8.0 - 9.0	< 1.5	< .4	< .6
			9.0 - 10.0	< 1.6	< .4	< .5

Table E-19
(continued)

Page 3 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
2550	1847	B3890R385	0.0 - 1.0	< 6.1	.8 \pm 0.4	1 \pm 0.8
			5.0 - 6.0	< 3.1	1.1 \pm 0.4	1.1 \pm 0.6
			9.0 - 10.0	< 3.2	< .4	.7 \pm 0.5
2560	1886	B3890R377	0.0 - 1.0	< 1.4	1.9 \pm 0.3	7.4 \pm 0.2
			7.0 - 8.0	< 2	< .8 \pm 0.2	1.2 \pm 0.7
			9.0 - 10.0	< 3	1.3 \pm 0.2	1.4 \pm 0.2
			10.0 - 10.9	< 1.9	< .5	1 \pm 0.4
2563	1859	B3890R382	0.0 - 1.0	< 7	1 \pm 0.5	1.5 \pm 0.8
			4.0 - 5.0	< 4.4	.8 \pm 0.5	1.1 \pm 0.8
			9.0 - 10.0	< 4.6	.6 \pm 0.3	1.1 \pm 0.5
			10.0 - 11.0	3.4 \pm 2.1	.6 \pm 0.3	.5 \pm 0.5
			11.0 - 12.0	3.5 \pm 2.8	.5 \pm 0.3	< .8
2566	1894	B3890R378	0.0 - 1.0	< 5	.6 \pm 0.1	.9 \pm 0.1
			5.0 - 6.0	< 1.8	.6 \pm 0.2	1 \pm 0.7
			7.0 - 8.0	< 2.1	.6 \pm 0.1	< .8
			8.0 - 9.0	< 4.5	1.6 \pm 0.3	5.1 \pm 0.7
			9.0 - 10.0	< 4.6	.6 \pm 0.1	.7 \pm 0.2
2574	1848	B3890R384	0.0 - 1.0	< 3.7	.8 \pm 0.4	1.2 \pm 0.4
			4.0 - 5.0	< 6.6	.5 \pm 0.4	1 \pm 0.5
			8.0 - 9.0	< 4	.7 \pm 0.3	.7 \pm 0.5
			9.0 - 10.0	< 3.7	.6 \pm 0.3	.7 \pm 0.4
2575	1848	B3890R383	0.0 - 1.0	< 4.6	.8 \pm 0.5	1.1 \pm 0.7
			3.0 - 4.0	< 5.5	1.1 \pm 0.6	< 1.1
2575	1873	B3890R376	0.0 - 1.0	< 2.3	.7 \pm 0.4	1.1 \pm 0.4
			6.0 - 7.0	< 2.1	.6 \pm 0.2	1.1 \pm 0.5
			10.0 - 11.0	< 1.6	< .4	< .5
			11.0 - 12.0	< 1.8	.7 \pm 0.2	< .6
2576	1895	B3890R431	0.0 - 1.0	< 3.3	1 \pm 0.2	1.5 \pm 0.3
			4.0 - 5.0	< 6	.7 \pm 0.4	1 \pm 0.2
			7.0 - 8.0	< 3.6	.5 \pm 0.4	.6 \pm 0.2
			9.0 - 10.0	< 1.7	.7 \pm 0.2	.7 \pm 0.2

U-5

Table R-19
(continued)

Page 4 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
2586	1873	B3890R430	0.0 - 1.0	< 3.3	.9 \pm 0.2	1.4 \pm 0.5
			4.0 - 5.0	< 6.1	.9 \pm 0.1	1.2 \pm 0.1
			7.0 - 8.0	< 1.6	.5 \pm 0.2	.7 \pm 0.1
2586	1895	B3890R432	0.0 - 1.0	< 2.4	.9 \pm 0.3	1.4 \pm 0.2
			4.0 - 6.0	< 5.8	.9 \pm 0.2	1.4 \pm 0.2
			6.0 - 7.0	< 8.1	1.2 \pm 0.5	5.3 \pm 0.8
			7.0 - 8.0	< 2.8	.7 \pm 0.2	.7 \pm 0.4
			9.0 - 10.0	< 3.2	.7 \pm 0.2	.9 \pm 0.3
2596	1895	B3890R437	0.0 - 1.0	< 1.9	.5 \pm 0.2	.9 \pm 0.4
			5.0 - 6.0	4.6 \pm 0.7	2.3 \pm 0.4	1.9 \pm 0.6
			9.0 - 10.0	< 1.7	.4 \pm 0.3	.6 \pm 0.3

Table E-20
Downhole Gamma Logging Results,
62 Trudy Drive

Page 1 of 10

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole HA126

2480	1853	0.5	6000
2480	1853	1.0	6000
2480	1853	1.5	6000
2480	1853	2.0	6000
2480	1853	2.5	8000
2480	1853	3.0	9000
2480	1853	3.5	27000

Borehole B3890R366^d

2487	1880	0.5	13000
2487	1880	1.0	16000
2487	1880	1.5	20000
2487	1880	2.0	22000
2487	1880	2.5	28000
2487	1880	3.0	52000
2487	1880	3.5	100000
2487	1880	4.0	486000
2487	1880	4.5	360000
2487	1880	5.0	342000
2487	1880	5.5	117000
2487	1880	6.0	48000
2487	1880	6.5	20000
2487	1880	7.0	17000

Borehole B3890C375^d

2488	1880	0.5	14000
2488	1880	1.0	15000
2488	1880	1.5	15000
2488	1880	2.0	18000
2488	1880	2.5	25000
2488	1880	3.0	49000
2488	1880	3.5	93000
2488	1880	4.0	166000
2488	1880	4.5	276000
2488	1880	5.0	288000
2488	1880	5.5	208000
2488	1880	6.0	51000

Table E-20
(continued)

Page 2 of 10

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R367^d</u>			
2493	1890	0.5	15000
2493	1890	1.0	2000
2493	1890	1.5	31000
2493	1890	2.0	59000
2493	1890	2.5	68000
2493	1890	3.0	76000
2493	1890	3.5	95000
2493	1890	4.0	53000
2493	1890	4.5	31000
2493	1890	5.0	61000
2493	1890	5.5	142000
2493	1890	6.0	63000
2493	1890	6.5	29000
2493	1890	7.0	21000
<u>Borehole B3890R365^d</u>			
2500	1877	0.5	35000
2500	1877	1.0	42000
2500	1877	1.5	63000
2500	1877	2.0	38000
2500	1877	2.5	17000
2500	1877	3.0	14000
2500	1877	3.5	13000
2500	1877	4.0	13000
2500	1877	4.5	14000
2500	1877	5.0	20000
2500	1877	5.5	52000
2500	1877	6.0	134000
2500	1877	6.5	41000
2500	1877	7.0	18000
2500	1877	7.5	13000
<u>Borehole B3890R371^d</u>			
2505	1847	0.5	22000
2505	1847	1.0	35000
2505	1847	1.5	45000
2505	1847	2.0	42000
2505	1847	2.5	26000
2505	1847	3.0	24000
2505	1847	3.5	29000

Table E-20
(continued)

Page 3 of 10

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)

Borehole B3890R371^d (continued)

2505	1847	4.0	27000
2505	1847	4.5	24000
2505	1847	5.0	24000
2505	1847	5.5	22000
2505	1847	6.0	21000
2505	1847	6.5	21000
2505	1847	7.0	20000
2505	1847	7.5	22000
2505	1847	8.0	21000

Borehole B3890R368^d

2506	1892	0.5	16000
2506	1892	1.0	13000
2506	1892	1.5	15000
2506	1892	2.0	20000
2506	1892	2.5	23000
2506	1892	3.0	18000
2506	1892	3.5	14000
2506	1892	4.0	13000
2506	1892	4.5	12000
2506	1892	5.0	12000
2506	1892	5.5	13000
2506	1892	6.0	16000
2506	1892	6.5	15000
2506	1892	7.0	13000

Borehole B3890R369^d

2511	1871	0.5	23000
2511	1871	1.0	42000
2511	1871	1.5	18000
2511	1871	2.0	15000
2511	1871	2.5	25000
2511	1871	3.0	16000
2511	1871	3.5	12000
2511	1871	4.0	11000
2511	1871	4.5	11000
2511	1871	5.0	11000
2511	1871	5.5	11000

Table E-20
(continued)

Page 4 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R372^d</u>			
2529	1895	0.5	14000
2529	1895	1.0	13000
2529	1895	1.5	11000
2529	1895	2.0	11000
2529	1895	2.5	11000
2529	1895	3.0	11000
2529	1895	3.5	11000
2529	1895	4.0	11000
2529	1895	4.5	12000
2529	1895	5.0	13000
2529	1895	5.5	13000
2529	1895	6.0	12000
2529	1895	6.5	12000
2529	1895	7.0	12000
2529	1895	7.5	11000
2529	1895	8.0	11000
2529	1895	8.5	12000
2529	1895	9.0	14000
2529	1895	9.5	13000
2529	1895	10.0	12000
<u>Borehole B3890R370^d</u>			
2530	1847	0.5	14000
2530	1847	1.0	29000
2530	1847	1.5	12000
2530	1847	2.0	12000
2530	1847	2.5	13000
2530	1847	3.0	11000
2530	1847	3.5	12000
2530	1847	4.0	12000
2530	1847	4.5	12000
2530	1847	5.0	11000
2530	1847	5.5	11000
2530	1847	6.0	11000
2530	1847	6.5	11000
2530	1847	7.0	11000
2530	1847	7.5	11000
2530	1847	8.0	10000

Table E-20
(continued)

Page 5 of 10

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R385^d</u>			
2550	1847	0.5	18000
2550	1847	1.0	10000
2550	1847	1.5	10000
2550	1847	2.0	11000
2550	1847	2.5	11000
2550	1847	3.0	12000
2550	1847	3.5	12000
2550	1847	4.0	12000
2550	1847	4.5	11000
2550	1847	5.0	12000
2550	1847	5.5	12000
2550	1847	6.0	11000
2550	1847	6.5	11000
2550	1847	7.0	11000
2550	1847	7.5	11000
2550	1847	8.0	9000
2550	1847	8.5	10000
2550	1847	9.0	10000
<u>Borehole B3890R377^d</u>			
2560	1886	0.5	17000
2560	1886	1.0	20000
2560	1886	1.5	14000
2560	1886	2.0	12000
2560	1886	2.5	11000
2560	1886	3.0	11000
2560	1886	3.5	11000
2560	1886	4.0	11000
2560	1886	4.5	11000
2560	1886	5.0	13000
2560	1886	5.5	17000
2560	1886	6.0	14000
2560	1886	6.5	14000
2560	1886	7.0	16000
2560	1886	7.5	29000
2560	1886	8.0	23000
2560	1886	8.5	16000
2560	1886	9.0	14000
2560	1886	9.5	14000

Table E-20
(continued)

Page 6 of 10

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R382^d</u>			
2563	1859	0.5	12000
2563	1859	1.0	11000
2563	1859	1.5	11000
2563	1859	2.0	11000
2563	1859	2.5	12000
2563	1859	3.0	13000
2563	1859	3.5	13000
2563	1859	4.0	13000
2563	1859	4.5	12000
2563	1859	5.0	13000
2563	1859	5.5	14000
2563	1859	6.0	12000
2563	1859	6.5	13000
2563	1859	7.0	13000
2563	1859	7.5	15000
2563	1859	8.0	15000
2563	1859	8.5	10000
2563	1859	9.0	12000
2563	1859	9.5	11000
<u>Borehole B3890R378^d</u>			
2566	1894	0.5	10000
2566	1894	1.0	11000
2566	1894	1.5	11000
2566	1894	2.0	11000
2566	1894	2.5	11000
2566	1894	3.0	12000
2566	1894	3.5	11000
2566	1894	4.0	12000
2566	1894	4.5	12000
2566	1894	5.0	13000
2566	1894	5.5	14000
2566	1894	6.0	27000
2566	1894	6.5	54000
2566	1894	7.0	86000
2566	1894	7.5	169000
2566	1894	8.0	77000
2566	1894	8.5	28000
2566	1894	9.0	14000
2566	1894	9.5	14000

Table E-20
(continued)

Page 7 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R384^d</u>			
2574	1848	0.5	10000
2574	1848	1.0	12000
2574	1848	1.5	12000
2574	1848	2.0	12000
2574	1848	2.5	12000
2574	1848	3.0	11000
2574	1848	3.5	12000
2574	1848	4.0	12000
2574	1848	4.5	11000
2574	1848	5.0	12000
2574	1848	5.5	12000
2574	1848	6.0	11000
2574	1848	6.5	9000
2574	1848	7.0	10000
2574	1848	7.5	10000
2574	1848	8.0	10000
<u>Borehole B3890R383^d</u>			
2575	1848	0.5	9000
2575	1848	1.0	10000
2575	1848	1.5	12000
2575	1848	2.0	12000
2575	1848	2.5	12000
2575	1848	3.0	11000
2575	1848	3.5	11000
2575	1848	4.0	12000
2575	1848	4.5	12000
2575	1848	5.0	12000
2575	1848	5.5	12000
2575	1848	6.0	15000
2575	1848	6.5	15000
<u>Borehole B3890R376^d</u>			
2575	1873	0.5	10000
2575	1873	1.0	11000
2575	1873	1.5	13000
2575	1873	2.0	16000
2575	1873	2.5	12000
2575	1873	3.0	12000
2575	1873	3.5	12000
2575	1873	4.0	12000

Table E-20
(continued)

Page 8 of 10

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R376^d</u> (continued)			
2575	1873	4.5	12000
2575	1873	5.0	13000
2575	1873	5.5	22000
2575	1873	6.0	38000
2575	1873	6.5	33000
2575	1873	7.0	18000
2575	1873	7.5	12000
2575	1873	8.0	11000
2575	1873	8.5	10000
2575	1873	9.0	10000
2575	1873	9.5	10000
2575	1873	10.0	10000
<u>Borehole B3890R431^d</u>			
2576	1895	0.5	11000
2576	1895	1.0	10000
2576	1895	1.5	10000
2576	1895	2.0	11000
2576	1895	2.5	12000
2576	1895	3.0	11000
2576	1895	3.5	12000
2576	1895	4.0	11000
2576	1895	4.5	11000
2576	1895	5.0	13000
2576	1895	5.5	16000
2576	1895	6.0	27000
2576	1895	6.5	58000
2576	1895	7.0	63000
2576	1895	7.5	105000
2576	1895	8.0	111000
2576	1895	8.5	56000
2576	1895	9.0	55000
2576	1895	9.5	56000
<u>Borehole B3890R430</u>			
2586	1873	0.5	8000
2586	1873	1.0	10000
2586	1873	1.5	9000
2586	1873	2.0	10000
2586	1873	2.5	11000
2586	1873	3.0	11000

Table E-20

(continued)

Page 9 of 10

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R430 (continued)</u>			
2586	1873	3.5	11000
2586	1873	4.0	11000
2586	1873	4.5	11000
2586	1873	5.0	11000
2586	1873	5.5	11000
2586	1873	6.0	14000
2586	1873	6.5	13000
2586	1873	7.0	10000
2586	1873	7.5	9000
2586	1873	8.0	9000
2586	1873	8.5	9000
2586	1873	9.0	9000
2586	1873	9.5	9000
<u>Borehole B3890R432</u>			
2586	1895	0.5	7000
2586	1895	1.0	9000
2586	1895	1.5	9000
2586	1895	2.0	9000
2586	1895	2.5	11000
2586	1895	3.0	11000
2586	1895	3.5	11000
2586	1895	4.0	11000
2586	1895	4.5	11000
2586	1895	5.0	12000
2586	1895	5.5	18000
2586	1895	6.0	37000
2586	1895	6.5	27000
2586	1895	7.0	13000
2586	1895	7.5	11000
2586	1895	8.0	11000
2586	1895	8.5	11000
2586	1895	9.0	10000
<u>Borehole B3890R437^d</u>			
2596	1895	0.5	6000
2596	1895	1.0	8000
2596	1895	1.5	8000
2596	1895	2.0	9000
2596	1895	2.5	10000
2596	1895	3.0	9000

Table E-20
(continued)

Page 10 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R437^d</u> (continued)			
2596	1895	3.5	10000
2596	1895	4.0	11000
2596	1895	4.5	14000
2596	1895	5.0	28000
2596	1895	5.5	23000
2596	1895	6.0	14000
2596	1895	6.5	11000
2596	1895	7.0	9000
2596	1895	7.5	8000
2596	1895	8.0	8000
2596	1895	8.5	7000
2596	1895	9.0	6000
2596	1895	9.5	4000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table E-21
Gamma Radiation Exposure Rates,
62 Trudy Drive

<u>Coordinates^a</u>		<u>Rate^b</u>
East	North	(μ R/h)
2500	1880	19
2570	1880	11

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table E-22
Surface and Subsurface Radionuclide Concentrations in Soil,
136 West Central Avenue

Page 1 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
10032	10170		0.0 - 0.5	< 8.8	< 1.5	< 2.6
10035	10250		0.0 - 0.5	< 3.7	.79 \pm .09	< 1.1
10040	10110		0.0 - 0.5	< 6.9	< 1.4	2.9 \pm 2.3
10040	10130		0.0 - 0.5	< 7.4	< 1.5	2.9 \pm 1.0
10040	10150		0.0 - 0.5	< 5.5	2.3 \pm .66	2.2 \pm 1.0
10040	10170		0.0 - 0.5	< 4	< .74	< 1.2
10040	10190		0.0 - 0.5	< 3.9	< .84	< 1.1
10040	10240		0.0 - 0.5	< 3.4	< .67	1.4 \pm .39
10040	10280		0.0 - 0.5	< 3.8	< .76	< 1
10040	10300		0.0 - 0.5	< 3.7	< .82	< 1.1
10050	10180		0.0 - 0.5	< 6.5	2 \pm .77	< 2
10050	10220		0.0 - 0.5	< 4.2	< .74	< 1
10050	10251		0.0 - 0.5	< 22.3	< 2.3	111.6 \pm 9.9
10060	10110		0.0 - 0.5	< 6.9	< 1.5	3.5 \pm .56
10060	10130		0.0 - 0.5	< 9.4	< 1.7	6.5 \pm 3.0
10060	10150		0.0 - 0.5	< 5.6	< 1	< 2
10060	10170		0.0 - 0.5	< 5.4	1.6 \pm .21	1.8 \pm .69
10060	10290		0.0 - 0.5	< 4.3	.83 \pm .22	< 1.2
10070	10240		0.0 - 0.5	< 3.8	< .7	< .95
10080	10120		0.0 - 0.5	< 7.5	< 1.5	< 2.8

E-70

Table E-22
(continued)

Page 2 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Surface (cont'd)						
10080	10130		0.0 - 0.5	< 6.3	< 1.2	2.9 \pm 1.6
10080	10150		0.0 - 0.5	< 5.1	< 1.1	2.1 \pm 1.2
10080	10190		0.0 - 0.5	< 3.9	.64 \pm .03	< 1
10080	10210		0.0 - 0.5	< 3.8	.9 \pm .14	< 1.1
10080	10236		0.0 - 0.5	< 4.2	< .75	< 1.1
10080	10310		0.0 - 0.5	< 3.7	.83 \pm .14	< .94
Subsurface						
10035	10236	B3891R647	0.0 - 2.0	< 3.3	< .67	1.1 \pm .17
10035	10239	B3891R648	0.0 - 2.0	< 3.4	< .79	1 \pm .91
			9.0 - 10.0	< 2.4	< .51	< .71
10035	10252	B3891R658	0.0 - 2.0	< 3.5	< .67	.87 \pm .31
			6.0 - 7.0	< 3.3	< .7	1.3 \pm .49
			9.0 - 10.0	< 2.8	< .52	< .81
10040	10130	B3891R642	0.0 - 1.0	< 8.1	3 \pm .58	3.2 \pm .31
			2.0 - 3.0	< 2.9	< .6	< .8
			6.0 - 7.0	< 2.3	< .47	< .58
			8.0 - 8.5	< 4.9	< 1	< 1.4
10040	10207	B3891R645	0.0 - 1.0	< 6.1	1.6 \pm .72	2.6 \pm 2.2
			2.0 - 3.0	< 8.1	3.8 \pm .23	4 \pm 2.7
			15.0 - 15.5	< 3	< .59	< .85
10042	10231	B3891R649	0.0 - 1.0	< 3.5	.87 \pm .25	1.1 \pm .37
			3.0 - 4.0	< 8.6	3.5 \pm 1.4	5 \pm .32
			9.0 - 10.0	< 2.4	< .5	< .61

E-71

Table E-22
(continued)

Page 3 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
Subsurface (cont'd)						
10042	10241	B3891R646	0.0 - 1.0	< 3.6	< .67	< 1.1
			2.0 - 4.0	< 9.5	2.1 \pm .68	20.2 \pm 4.6
			4.0 - 6.0	< 11.2	< 1.7	17.8 \pm 5.8
			6.0 - 7.0	< 19.3	< 2	63.9 \pm 14.6
			7.0 - 8.0	< 11	< 1.3	16.3 \pm 3.1
13.0 - 14.0	< 3.1	< .47	< .94			
10043	10271	B3891R659	0.0 - 2.0	< 2.4	< .51	.83 \pm .10
			3.0 - 4.0	< 7.6	3 \pm .74	4.3 \pm 1.1
			9.0 - 10.0	< 2.6	< .46	< .69
10047	10175	B3891R643	0.0 - 1.0	< 8.7	3.4 \pm .58	3.8 \pm .16
			1.0 - 2.0	< 8.2	3.8 \pm .36	3 \pm 1.3
			13.0 - 14.0	< 3.5	.95 \pm .15	1.4 \pm .87
10050	10223	B3891R656	0.0 - 1.0	< 4.7	< .95	1.7 \pm .19
			4.0 - 5.0	< 8	3.4 \pm .85	3.6 \pm 1.1
			9.0 - 10.0	< 3	< .63	< .95
10050	10234	B3891R650	0.0 - 1.0	< 3.2	< .63	< .9
			2.0 - 3.0	< 4.4	< .82	2.8 \pm .28
			3.0 - 4.0	< 13.8	3.2 \pm .04	28.3 \pm 4.7
			5.0 - 6.0	< 25	< 2.8	115 \pm 21
			6.0 - 7.0	< 6.8	< 1.1	6.9 \pm 2.4
			9.0 - 10.0	< 3.2	< .57	1 \pm .51
10050	10251	B3891R653	1.0 - 1.5	< 6.7	< .81	12.4 \pm .76
			2.0 - 2.5	< 3.5	< .54	2 \pm .35
10050	10268	B3891R655	0.5 - 1.0	< 7.4	< .92	14.4 \pm 3.1
			1.0 - 1.5	< 9.9	< 1	26.7 \pm 1.6
			1.5 - 2.0	< 4.2	.83 \pm .58	4.3 \pm .95
10053	10289	B3891R660	0.0 - 1.0	< 5.2	< .85	< 1.4
			2.0 - 4.0	< 6.1	< 1.07	3.8 \pm .81
			9.0 - 10.0	< 5.1	< .98	< 1.3

Table E-22
(continued)

Page 4 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
10055	10254	B3891R654	0.5 - 1.0	< 5.0	< .82	2.2 \pm 1.5
			1.0 - 1.5	< 5.4	< .91	3.6 \pm .79
			1.5 - 2.0	< 4.1	.90	2.3 \pm .55
10060	10234	B3891R651	0.0 - 1.0	< 4.4	< .79	< 1.1
			3.0 - 4.0	< 10.1	1.4 \pm .26	21.5 \pm .15
			4.0 - 5.0	< 5.7	< 1	4.8 \pm 1.7
			5.0 - 6.0	< 3.3	< .74	< .88
			9.0 - 10.0	< 3.4	1.1 \pm .70	1.2 \pm .98
10064	10226	B3891R657	0.0 - 1.0	< 3.7	< .77	< .97
			2.0 - 4.0	< 4.3	< .80	2.5 \pm .04
			9.0 - 10.0	< 2.4	< .50	< .67
10071	10177	B3891R644	0.0 - 1.0	< 6.4	< 1.4	2.6 \pm 2.5
			4.0 - 5.0	< 2.3	< .41	< .47
			7.0 - 8.0	< 2.6	< .56	< .68
10071	10297	B3891R661	0.0 - 1.0	< 2.9	< .66	1 \pm .31
			4.0 - 5.0	< 2.4	< .57	.95 \pm .06
10079	10236	B3891R652	0.0 - 1.0	< 4.2	< .83	1.8 \pm .29
			3.0 - 4.0	< 3.5	< .66	1.3 \pm .99
			8.0 - 9.0	< 5.5	< 1.2	< 1.3
10080	10120	B3891R641	0.0 - 1.0	< 4.4	< .83	< 1.1
			1.0 - 2.0	< 2.9	< .61	< .76
			3.0 - 4.0	< 2.5	.42 \pm .33	< .7
			6.0 - 7.0	< 2.9	< .59	< .83

Table E-23
Downhole Gamma Logging Results,
136 West Central Avenue

Page 1 of 10

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3891R648</u>			
10035	10239	0.5	8000
10035	10239	1.0	7000
10035	10239	1.5	8000
10035	10239	2.0	11000
10035	10239	2.5	9000
10035	10239	3.0	15000
10035	10239	3.5	14000
10035	10239	4.0	10000
10035	10239	4.5	9000
10035	10239	5.0	8000
10035	10239	5.5	10000
10035	10239	6.0	9000
10035	10239	6.5	7000
10035	10239	7.0	7000
10035	10239	7.5	7000
10035	10239	8.0	7000
10035	10239	8.5	7000
10035	10239	9.0	8000
<u>Borehole B3891R658</u>			
10035	10252	0.5	12000
10035	10252	1.0	11000
10035	10252	1.5	11000
10035	10252	2.0	14000
10035	10252	2.5	17000
10035	10252	3.0	13000
10035	10252	3.5	11000
10035	10252	4.0	10000
10035	10252	4.5	7000
10035	10252	5.0	7000
10035	10252	5.5	10000
10035	10252	6.0	9000
10035	10252	6.5	8000
10035	10252	7.0	8000
10035	10252	7.5	7000
10035	10252	8.0	8000
10035	10252	8.5	8000
10035	10252	9.0	8000

Table E-23

(continued)

Page 2 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3891R642^d</u>			
10040	10130	0.5	8200
10040	10130	1.0	7800
10040	10130	1.5	6800
10040	10130	2.0	6300
10040	10130	2.5	6700
10040	10130	3.0	6200
10040	10130	3.5	6400
10040	10130	4.0	7000
10040	10130	4.5	7200
10040	10130	5.0	6200
10040	10130	5.5	7600
10040	10130	6.0	8000
10040	10130	6.5	9000
10040	10130	7.0	9000
<u>Borehole B3891R645</u>			
10040	10207	0.5	8000
10040	10207	1.0	10000
10040	10207	1.5	12000
10040	10207	2.0	16000
10040	10207	2.5	18000
10040	10207	3.0	20000
10040	10207	3.5	18000
10040	10207	4.0	14000
10040	10207	4.5	11000
10040	10207	5.0	8000
10040	10207	5.5	7000
10040	10207	6.0	6000
10040	10207	6.5	5000
10040	10207	7.0	4000
10040	10207	7.5	5000
10040	10207	8.0	4000
10040	10207	8.5	5000
10040	10207	9.0	5000
10040	10207	9.5	4000
10040	10207	10.0	4000
10040	10207	10.5	5000
10040	10207	11.0	4000
10040	10207	11.5	5000
10040	10207	12.0	6000
10040	10207	12.5	8000

Table E-23

(continued)

Page 3 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3891R645</u> (continued)			
10040	10207	13.0	8000
10040	10207	13.5	9000
10040	10207	14.0	9000
10040	10207	14.5	10000
10040	10207	15.0	12000
<u>Borehole B3891R649</u>			
10042	10231	0.5	8000
10042	10231	1.0	9000
10042	10231	1.5	9000
10042	10231	2.0	10000
10042	10231	2.5	11000
10042	10231	3.0	14000
10042	10231	3.5	19000
10042	10231	4.0	25000
10042	10231	4.5	20000
10042	10231	5.0	17000
10042	10231	5.5	14000
10042	10231	6.0	10000
10042	10231	6.5	8000
10042	10231	7.0	7000
10042	10231	7.5	7000
10042	10231	8.0	6000
10042	10231	8.5	5000
10042	10231	9.0	6000
10042	10231	9.5	6000
10042	10231	10.0	6000
<u>Borehole B3891R646</u>			
10042	10241	0.5	4000
10042	10241	1.0	9000
10042	10241	1.5	10000
10042	10241	2.0	12000
10042	10241	2.5	9000
10042	10241	3.0	24000
10042	10241	3.5	115000
10042	10241	4.0	103000
10042	10241	4.5	70000
10042	10241	5.0	47000
10042	10241	5.5	125000

Table E-23
(continued)

Page 4 of 10

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3891R646 (continued)</u>			
10042	10241	6.0	181000
10042	10241	6.5	86000
10042	10241	7.0	24000
10042	10241	7.5	13000
10042	10241	8.0	10000
10042	10241	8.5	10000
10042	10241	9.0	10000
10042	10241	9.5	10000
10042	10241	10.0	10000
10042	10241	10.5	10000
10042	10241	11.0	10000
10042	10241	11.5	10000
<u>Borehole B3891R659</u>			
10043	10271	0.5	4000
10043	10271	1.0	4000
10043	10271	1.5	7000
10043	10271	2.0	7000
10043	10271	2.5	9000
10043	10271	3.0	15000
10043	10271	3.5	16000
10043	10271	4.0	14000
10043	10271	4.5	10000
10043	10271	5.0	5000
10043	10271	5.5	5000
10043	10271	6.0	8000
10043	10271	6.5	8000
10043	10271	7.0	7000
10043	10271	7.5	6000
10043	10271	8.0	6000
10043	10271	8.5	6000
10043	10271	9.0	6000
<u>Borehole B3891R643</u>			
10047	10175	0.5	12000
10047	10175	1.0	17000
10047	10175	1.5	18000
10047	10175	2.0	16000
10047	10175	2.5	14000
10047	10175	3.0	8000

Table E-23
(continued)

Page 5 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3891R643 (continued)

10047	10175	3.5	6000
10047	10175	4.0	5000
10047	10175	4.5	5000
10047	10175	5.0	5000
10047	10175	5.5	5000
10047	10175	6.0	5000
10047	10175	6.5	5000
10047	10175	7.0	4000
10047	10175	7.5	5000
10047	10175	8.0	5000
10047	10175	8.5	5000
10047	10175	9.0	6000
10047	10175	9.5	7000
10047	10175	10.0	10000
10047	10175	10.5	9000
10047	10175	11.0	10000
10047	10175	11.5	11000
10047	10175	12.0	11000
10047	10175	12.5	10000
10047	10175	13.0	13000
10047	10175	13.5	13000
10047	10175	14.0	13000

Borehole B3891R656

10050	10223	0.5	10000
10050	10223	1.0	9000
10050	10223	1.5	10000
10050	10223	2.0	10000
10050	10223	2.5	10000
10050	10223	3.0	10000
10050	10223	3.5	13000
10050	10223	4.0	19000
10050	10223	4.5	16000
10050	10223	5.0	14000
10050	10223	5.5	11000
10050	10223	6.0	9000
10050	10223	6.5	8000
10050	10223	7.0	7000
10050	10223	7.5	7000
10050	10223	8.0	6000

Table E-23

(continued)

Page 6 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3891R656 (continued)</u>			
10050	10223	8.5	6000
10050	10223	9.0	7000
10050	10223	9.5	8000
10050	10223	10.0	8000
<u>Borehole B3891R650</u>			
10050	10234	0.5	9000
10050	10234	1.0	9000
10050	10234	1.5	10000
10050	10234	2.0	12000
10050	10234	2.5	19000
10050	10234	3.0	54000
10050	10234	3.5	95000
10050	10234	4.0	86000
10050	10234	4.5	80000
10050	10234	5.0	124000
10050	10234	5.5	104000
10050	10234	6.0	35000
10050	10234	6.5	15000
10050	10234	7.0	10000
10050	10234	7.5	9000
10050	10234	8.0	8000
10050	10234	8.5	7000
10050	10234	9.0	7000
10050	10234	9.5	7000
<u>Borehole B3891R653</u>			
10050	10251	0.5	133000
10050	10251	1.0	260000
10050	10251	1.5	48000
10050	10251	2.0	26000
10050	10251	2.5	15000
10050	10251	3.0	10000
10050	10251	3.5	9000
<u>Borehole B3891R655</u>			
10050	10268	0.5	75000
10050	10268	1.0	81000
10050	10268	1.5	25000
10050	10268	2.0	17000

Table E-23
(continued)

Page 7 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3891R660</u>			
10053	10289	0.5	7000
10053	10289	1.0	8000
10053	10289	1.5	12000
10053	10289	2.0	14000
10053	10289	2.5	14000
10053	10289	3.0	14000
10053	10289	3.5	13000
10053	10289	4.0	10000
10053	10289	4.5	9000
10053	10289	5.0	8000
10053	10289	5.5	8000
10053	10289	6.0	7000
10053	10289	6.5	7000
10053	10289	7.0	9000
10053	10289	7.5	10000
<u>Borehole B3891R654</u>			
10055	10254	0.5	11000
10055	10254	1.0	28000
10055	10254	1.5	11000
10055	10254	2.0	8000
<u>Borehole B3891R651</u>			
10061	10234	0.5	8000
10061	10234	1.0	9000
10061	10234	1.5	10000
10061	10234	2.0	10000
10061	10234	2.5	16000
10061	10234	3.0	31000
10061	10234	3.5	47000
10061	10234	4.5	53000
10061	10234	5.0	40000
10061	10234	5.5	17000
10061	10234	6.0	9000
10061	10234	6.5	9000
10061	10234	7.0	9000
10061	10234	7.5	9000
10061	10234	8.0	8000
10061	10234	8.5	8000
10061	10234	9.0	8000
10061	10234	9.5	8000

Table E-23
(continued)

Page 8 of 10

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3891R657</u>			
10064	10226	0.5	8000
10064	10226	1.0	9000
10064	10226	1.5	10000
10064	10226	2.0	11000
10064	10226	2.5	16000
10064	10226	3.0	17000
10064	10226	3.5	10000
10064	10226	4.0	10000
10064	10226	4.5	12000
10064	10226	5.0	11000
10064	10226	5.5	9000
10064	10226	6.0	9000
10064	10226	6.5	9000
10064	10226	7.0	9000
10064	10226	7.5	6000
10064	10226	8.0	6000
10064	10226	8.5	9000
10064	10226	9.0	7000
<u>Borehole B3891R644</u>			
10071	10177	0.5	8000
10071	10177	1.0	8000
10071	10177	1.5	10000
10071	10177	2.0	10000
10071	10177	2.5	6000
10071	10177	3.0	6000
10071	10177	3.5	8000
10071	10177	4.0	5000
10071	10177	4.5	5000
10071	10177	5.0	6000
10071	10177	5.5	8000
10071	10177	6.0	6000
10071	10177	6.5	6000
10071	10177	7.0	6000
<u>Borehole B3891R661</u>			
10071	10297	0.5	7000
10071	10297	1.0	9000
10071	10297	1.5	10000
10071	10297	2.0	12000

Table E-23
(continued)

Page 9 of 10

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3891R661 (continued)</u>			
10071	10297	2.5	12000
10071	10297	3.0	10000
10071	10297	3.5	10000
10071	10297	4.0	10000
10071	10297	4.5	9000
10071	10297	5.0	10000
10071	10297	5.5	10000
10071	10297	6.0	10000
10071	10297	6.5	12000
<u>Borehole B3891R652</u>			
10079	10236	0.5	8000
10079	10236	1.0	9000
10079	10236	1.5	9000
10079	10236	2.0	10000
10079	10236	2.5	10000
10079	10236	3.0	11000
10079	10236	3.5	10000
10079	10236	4.0	8000
10079	10236	4.5	10000
10079	10236	5.0	9000
10079	10236	5.5	9000
10079	10236	6.0	8000
10079	10236	6.5	8000
10079	10236	7.0	8000
10079	10236	7.5	8000
10079	10236	8.0	8000
<u>Borehole B3891R641</u>			
10080	10120	0.5	10000
10080	10120	1.0	12000
10080	10120	1.5	13000
10080	10120	2.0	8600
10080	10120	2.5	6800
10080	10120	3.0	5800
10080	10120	3.5	5400
10080	10120	4.0	5900
10080	10120	4.5	4900
10080	10120	5.0	4700

Table E-23
(continued)

Page 10 of 10

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3891R641 (continued)</u>			
10080	10120	5.5	4900
10080	10120	6.0	4200
10080	10120	6.5	6900
10080	10120	7.0	7700

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table E-24
Gamma Radiation Exposure Rates,
136 West Central Avenue

<u>Coordinates^a</u>		Rate ^b
East	North	(μ R/h)
10040	10120	15
10040	10200	12
10040	1290	8
10070	10160	13
10070	10230	11
10070	10290	9

Interior of Residence

Location

1	20
2	16
3	17
4	19
5	19
6	12

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Chemical Data

Table E-25
Metals and Rare Earths,
Residential Vicinity Properties,
Soil Samples

Page 1 of 2

Sample ID No. Borehole ID No. Sample Depth (ft)	138-VPC-001 B3890C0352 0 - 2	138-VPC-002 B3890C352 2 - 4	138-VPC-003 B3890C353 0 - 2	138-VPC-004 B3890C353 2 - 4	138-VPC-005 B3890C353 4 - 6	138-VPC-011 B3890C364 0 - 2
Analyte						
Aluminum, Total	6170 =	9260 =	5480 =	7240 =	4150 =	4620 J
Antimony, Total	9.2 BJ	10.0 U	13.8 U	12.4 U	10.0 U	6.1 BJ
Arsenic, Total	3.2 J	1.6 BJ	4.2 J	2.4 J	1.2 BJ	3.2 J
Barium, Total	82.0 =	33.4 U	242 =	64.3 =	33.5 U	65.3 =
Beryllium, Total	0.97 U	0.83 U	1.1 U	1.0 U	0.84 U	0.41 B
Boron, Total	19.5 U	16.7 U	22.9 U	20.6 U	16.7 U	19.3 U
Cadmium, Total	0.90 U	0.86 U	1.8 =	0.92 U	0.85 U	0.78 U
Calcium, Total	1670 =	835 U	6910 =	14300 =	837 U	898 B
Cerium, Total	39.0 U	33.4 U	67.0 =	41.2 U	33.5 U	141 =
Chromium, Total	4.7 =	3.5 =	9.4 =	3.1 =	1.7 U	22.2 J
Cobalt, Total	9.7 U	8.3 U	11.5 U	10.3 U	8.4 U	3.9 B
Copper, Total	12.8 R	4.2 U	43.5 J	20.2 J	4.9 R	25.0 J
Dysprosium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Erbium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Europium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Gadolinium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Holmium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Iron, Total	7520 =	8970 =	8510 =	12000 =	4320 =	6710 J
Lanthanum, Total	97.4 U	33.4 U	53.0 =	41.2 U	33.5 U	107 =
Lead, Total	220 J	6.6 J	1000 J	163 J	4.2 J	62.9 J
Lithium, Total	19.5 U	16.7 U	22.9 U	20.6 U	16.7 U	19.3 U
Lutetium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Magnesium, Total	974 U	835 U	2170 =	1940 =	837 U	808 B
Manganese, Total	121 =	123 =	251 =	129 =	41.3 =	222 J
Molybdenum, Total	19.5 U	16.7 U	22.9 U	20.6 U	16.7 U	19.3 U
Neodymium, Total						58.7 =
Nickel, Total	7.8 U	6.7 U	9.2 U	8.2 U	6.7 U	6.5 B
Potassium, Total	974 U	835 U	1150 U	1030 U	837 U	317 B
Praseodymium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Samarium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Selenium, Total	0.46 JU	0.44 JU	0.47 JU	0.46 JU	0.39 JU	0.43 J
Silver, Total	0.78 UR	0.86 UR	0.97 UR	0.92 UR	0.85 UR	0.78 UR
Sodium, Total	974 U	835 U	1150 U	1030 U	837 U	46.5 B
Tellurium, Total						
Terbium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Thallium, Total	0.92 UJ	0.87 UJ	0.93 UJ	0.91 UJ	0.79 UJ	0.85 UJ
Thulium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Vanadium, Total	11.4 =	11.7 =	20.2 =	15.2 =	8.4 U	14.3 =
Ytterbium, Total	39.0 U	33.4 U	45.9 U	41.2 U	33.5 U	38.5 U
Zinc, Total	202 =	23.7 =	655 =	282 =	17.3 =	48.5 J

Concentration Units - mg/kg - milligrams per kilogram.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

R - Unreliable result. Analyte may or may not be present in sample.

Table E-25
(continued)

Sample ID No. Borehole ID No. Sample Depth (ft)	138-VPC-012 B3890C0364 2 - 4	138-VPC-013 B3890C364 4 - 6	138-VPC-027 B3890C375 0 - 2	138-VPC-028 B3890C375 2 - 4	138-VPC-029 B3890C375 4 - 6	138-VPC-030 B3890C375 6 - 8
Analyte						
Aluminum, Total	7840 J	4730 J	5860 =	8870 =	15000 =	7550 =
Antimony, Total	4.3 UR	6.5 BJ	5.1 UJ	6.1 UJ	5.0 =	5.3 UJ
Arsenic, Total	3.3 J	0.30 J	5.1 =	12.7 =	6.0 UJ	5.3 UJ
Barium, Total	67.1 =	113 =	63.5 =	165 =	5.0 =	2.4 =
Beryllium, Total	0.33 B	0.33 B	0.44 B	0.52 B	299 =	136 =
Boron, Total	19.6 U	21.7 U	23.3 U	27.6 U	0.82 B	0.55 B
Cadmium, Total	0.78 U	0.87 U	0.93 U	1.1 U	27.2 U	24.1 U
Calcium, Total	1180 =	853 B	2640 J	1620 J	1.1 U	0.96 U
Cerium, Total	100 =	43.3 U	53.1 =	652 =	2190 J	2300 J
Chromium, Total	16.7 J	8.9 J	21.2 =	221 =	102 =	135 =
Cobalt, Total	4.4 B	3.6 B	5.6 B	5.1 B	29.4 =	44.7 =
Copper, Total	18.1 J	2.9 BR	17.4 J	60.2 J	5.3 B	7.3 B
Dysprosium, Total	39.2 U	43.3 U	46.5 U	55.3 U	12.4 J	17.7 J
Erbium, Total	39.2 U	43.3 U	46.5 U	55.3 U	54.4 U	48.2 U
Europium, Total	39.2 U	43.3 U	46.5 U	55.3 U	54.4 U	48.2 U
Gadolinium, Total	39.2 U	43.3 U	46.5 U	55.3 U	54.4 U	48.2 U
Holmium, Total	39.2 U	43.3 U	46.5 U	55.3 U	54.4 U	48.2 U
Iron, Total	10300 J	6780 J	11500 =	11700 =	54.4 U	48.2 U
Lanthanum, Total	61.7 =	43.3 U	46.5 U	485 =	9120 =	15900 =
Lead, Total	54.8 J	5.6 J	95.9 =	122 =	65.9 =	95.9 =
Lithium, Total	19.6 U	21.7 U	23.3 U	27.6 U	27.7 =	20.0 =
Lutetium, Total	39.2 U	43.3 U	1150 =	55.3 U	27.2 U	24.1 U
Magnesium, Total	1420 =	845 B	1370 =	55.3 U	54.4 U	48.2 U
Manganese, Total	252 J	73.3 J	237 J	1370 B	1410 =	2400 =
Molybdenum, Total	19.6 U	21.7 U	23.3 U	191 J	82.1 J	184 J
Neodymium, Total	39.2 U	43.3 U	46.5 U	27.6 U	27.2 U	24.1 U
Nickel, Total	8.9 =	5.5 B	9.3 =	336 =	54.4 U	65.8 =
Potassium, Total	351 B	223 B	566 B	10.2 B	9.3 B	15.0 =
Praseodymium, Total	39.2 U	43.3 U	46.5 U	391 B	258 B	534 B
Samarium, Total	39.2 U	43.3 U	46.5 U	55.3 U	54.4 U	48.2 U
Selenium, Total	0.58 BJ	0.30 UJ	0.49 JB	55.3 U	54.4 U	48.2 U
Silver, Total	0.78 UR	0.87 UR	0.93 UJ	2.2 =	0.84 JB	0.48 JU
Sodium, Total	53.0 B	62.0 B	86.7 B	1.1 UJ	1.1 UJ	0.96 UJ
Tellurium, Total	39.2 U	43.3 U	46.5 U	56.3 B	60.5 B	115 B
Terbium, Total	39.2 U	43.3 U	46.5 U	55.3 U	54.4 U	48.2 U
Thallium, Total	0.85 UJ	0.60 UJ	9.3 UJ	7.9 UJ	2.5 UJ	0.96 UJ
Thulium, Total	39.2 U	43.3 U	46.5 U	55.3 U	54.4 U	48.2 U
Vanadium, Total	15.6 =	12.6 =	17.1 =	21.3 =	31.4 =	16.0 =
Ytterbium, Total	39.2 U	43.3 U	46.5 U	55.3 U	54.4 U	48.2 U
Zinc, Total	48.6 J	16.3 R	127 J	82.0 J	66.3 J	47.2 J

Concentration Units - mg/kg - milligrams per kilogram.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

R - Unreliable result. Analyte may or may not be present in sample.

NOTE: Unreliable results due to analyte concentrations less than five times that found in the field blank.

Table E-26
Total Petroleum Hydrocarbons,
Residential Vicinity Properties, Soil Samples

Sample ID No.	Borehole ID No.	Sample Depth (ft)	Concentration (mg/kg)	Flag
138-VPC-011	B3890C364	0-2	12	B
138-VPC-012	B3890C364	2-4	22	B
138-VPC-013	B3890C364	4-6	5.7	B
138-VPC-027	B3890C375	0-2	150	=
138-VPC-028	B3890C375	2-4	40	B
138-VPC-029	B3890C375	4-6	26	B
138-VPC-030	B3890C375	6-8	12	B

Concentration Units mg/kg - milligrams per kilogram.

B - Analyte found in associated blank.

= - No data qualifier required.

Table E-27
PCBs, Residential Vicinity Properties,
Soil Samples

Page 1 of 3

Sample ID No.	138-VPC-001	138-VPC-002	138-VPC-003	138-VPC-004	138-VPC-005
Borehole ID No.	B3890C352	B3890C352	B3890C353	B3890C353	B3890C353
Sample Depth (ft)	0 - 2	2 - 4	0 - 2	0 - 4	4 - 6
Analyte					
AROCLOR-1016	45 U	44 U	93 U	45 U	39 U
AROCLOR-1221	45 U	44 U	93 U	45 U	39 U
AROCLOR-1232	45 U	44 U	93 U	45 U	39 U
AROCLOR-1242	45 U	44 U	93 U	45 U	39 U
AROCLOR-1248	45 U	44 U	93 U	45 U	39 U
AROCLOR-1254	90 U	88 U	190 U	90 U	78 U
AROCLOR-1260	90 U	88 U	190 U	90 U	78 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
R - Unreliable result. Analyte may or may not be present in sample.

E-03

Table E-27

(continued)

Page 2 of 3

Sample ID No. Borehole ID No. Sample Depth (ft)	138-VPC-011 B3890C364 6 - 8.5	138-VPC-012 B3890C364 0 - 2	138-VPC-013 B3890C364 2 - 6	138-VPC-027 B3890C375 0 - 2
Analyte				
AROCLOR-1016	46 U	45 R	47 U	2400 U
AROCLOR-1221	46 U	45 R	47 U	2400 U
AROCLOR-1232	46 U	45 R	47 U	2400 U
AROCLOR-1242	46 U	45 R	47 U	2400 U
AROCLOR-1248	46 U	45 R	47 U	2400 U
AROCLOR-1254	93 U	91 R	94 U	4800 U
AROCLOR-1260	93 U	91 R	94 U	4800 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

R - Unreliable result. Analyte may or may not be present in sample.

Table E-27
(continued)

Page 3 of 3

Sample ID No. Borehole ID No. Sample Depth (ft)	138-VPC-028 B3890C375 2 - 4	138-VPC-029 B3890C375 4 - 6	138-VPC-030 B3890C375 6 - 8
Analyte			
AROCLOR-1016	55 U	54 U	43 U
AROCLOR-1221	55 U	54 U	43 U
AROCLOR-1232	55 U	54 U	43 U
AROCLOR-1242	55 U	54 U	43 U
AROCLOR-1248	55 U	54 U	43 U
AROCLOR-1254	110 U	110 U	86 U
AROCLOR-1260	110 U	110 U	86 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
R - Unreliable result. Analyte may or may not be present in sample.

Table E-28
TCLP Metals, Residential Vicinity Properties,
Soil Samples

Page 1 of 2

Sample ID No.	138-VPC-001	138-VPC-002	138-VPC-003	138-VPC-004	138-VPC-005	138-VPC-011
Borehole ID No.	B3890C0352	B3890C352	B3890C353	B3890C353	B3890C353	B3890C364
Sample Depth (ft)	0 - 2	2 - 4	0 - 2	2 - 4	4 - 6	0 - 2
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	550 =	496 =	1020 =	562 =	208 =	512 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	12.2 =	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Lead, TCLP Leachate	500 U	500 U	754 =	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table E-28
(continued)

Page 2 of 2

Sample ID No. Borehole ID No. Sample Depth (ft)	138-VPC-012 B3890C0364 2 - 4	138-VPC-013 B3890C364 4 - 6	138-VPC-027 B3890C375 0 - 2	138-VPC-028 B3890C375 2 - 4	138-VPC-029 B3890C375 4 - 6	138-VPC-030 B3890C375 6 - 8
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	528 =	980 =	454 =	200 U	821 =	879 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Lead, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.25 U	0.25 U	0.25 U	0.25 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	20.2 =

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.

Table E-29
Corrosivity/Reactivity, Residential Vicinity Properties,
Soil Samples

Page 1 of 2

Sample ID No.	138-VPC-001	138-VPC-002	138-VPC-003	138-VPC-004	138-VPC-005	138-VPC-011
Borehole ID No.	B3890C0352	B3890C352	B3890C353	B3890C353	B3890C353	B3890C364
Sample Depth (ft)	0 - 2	2 - 4	0 - 2	2 - 4	4 - 6	0 - 2
Analyte						
Corrosivity by pH	NR	NR	NR	NR	NR	7.0 =
Cyanide, Total	0.59 U	0.55 U	0.61 U	0.58 U	0.54 U	0.56 U
Sulfide	0.29 U	0.27 U	0.30 U	0.29 U	0.27 U	0.28 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

NR - Analysis not requested.

= - No data qualifier required.

Table E-29

(continued)

Page 2 of 2

Sample ID No.	138-VPC-012	138-VPC-013	138-VPC-027	138-VPC-028	138-VPC-029	138-VPC-030
Borehole ID No.	B3890C0364	B3890C364	B3890C375	B3890C375	B3890C375	B3890C375
Sample Depth (ft)	2 - 4	4 - 6	0 - 2	2 - 4	4 - 6	6 - 8
Analyte						
Corrosivity by pH	6.5 =	6.9 =	7.5 =	6.0 =	4.9 =	6.9 =
Cyanide, Total	0.59 U	0.56 U	0.58 U	2.2 =	1.5 =	0.64 =
Sulfide	0.29 U	0.28 U	0.29 U	0.35 U	0.34 U	0.32 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

NR - Analysis not requested.

= - No data qualifier required.

Table E-30
Mobile Ions, Residential Vicinity Properties,
Soil Samples

Page 1 of 3

Sample ID No.	138-VPC-001	138-VPC-002	138-VPC-003	138-VPC-004	138-VPC-005
Borehole ID No.	B3890C352	B3890C352	B3890C353	B3890C353	B3890C353
Sample Depth (ft)	0 - 2	2 - 4	0 - 2	0 - 4	4 - 6
Analyte					
% Solids	85.3 =	91.1 =	82.2 =	86.6 =	93.0 =
Chloride ^a	33.2 =	27.4 U	30.4 U	28.9 U	26.9 U
Nitrate, as N ^a	2.6 =	2.9 =	7.4 =	6.7 =	3.5 =
Phosphate, as P ^a	537 =	116 =	949 =	610 =	290 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table E-30
(continued)

Page 2 of 3

Sample ID No.	138-VPC-011	138-VPC-012	138-VPC-013
Borehole ID No.	B3890C364	B3890C364	B3890C364
Sample Depth (ft)	0 - 2	2 - 4	4 - 6
Analyte			
% Solids	90.0 =	85.1 =	89.4 =
Chloride ^a	27.8 U	58.7 U	27.9 U
Nitrate, as N ^a	3.0 =	2.7 =	1.9 =
Phosphate, as P ^a	237 =	524 =	288 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

(continued)

Page 3 of 3

Sample ID No.	138-VPC-027	138-VPC-028	138-VPC-029	138-VPC-030
Borehole ID No.	B3890C0375	B3890C375	B3890C375	B3890C375
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8
<hr/>				
Analyte				
% Solids	85.0 =	72.3 =	73.6 =	77.6 =
Chloride ^a	58.8 U	69.1 U	68.0 U	64.5 U
Nitrate, as N ^a	11.0 =	1.8 =	3.6 =	3.7 =
Phosphate, as P ^a	588 =	1780 =	755 =	535 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
= - No data qualifier required.

Geologic Logs



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
70 Hunter Avenue				N 9,775.0; E 10,911.0		14501	1 OF 1	R588					
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-20-90		11-20-90	Hydro Group, Inc.	Soil Sentry		8"	0.8	7.2	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.6/58*		0	4	NA	64.0	/ none ATD / NA		0.8/63.2					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.1	4 4 5 6					64.0				(Template: MYWD) 0.0 - 0.8 ft: Silty SAND, (SM); Blackish red (5R2/2), sand is fine grained, poorly sorted, with roots, firm, moist. 0.8 - 7.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted with subangular to subrounded sandstone gravel, firm, moist; changing to Sandstone, weathered, interlayered with fine grained sand, blocky, iron-oxide cement, at 6.0'.	Complete borehole number is B3890R588. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.4	4 4 10 10					63.2 62.9					
SS	2.0	1.1	6 20 34 38					62.0					
SS	2.0	1.0	10 20 34 30					60.6 60.0					
								58.9	5				
								58.0 57.0 56.0					
TOTAL DEPTH = 8.0 FT.												Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).													

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

70 Hunter Avenue

Last Update:
10-08-92

HOLE NO.
R588



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R589
SITE 70 Hunter Avenue			COORDINATES N 9681.0; E 10931.0			ANGLE FROM HORIZ Vertical		
BEGUN 11-20-90	COMPLETED 11-20-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 7.5	ROCK (FT.) 2.5	TOTAL DEPTH 10.0
CORE RECOVERY (FT./%) 7.4/74*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 61.0	DEPTH/EL. GROUND WATER NA		DEPTH/EL. TOP OF ROCK 7.5/53.5
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							61.0					
SS	2.0	1.6	5 8 0				60.5				0.0 - 0.5 ft: FILL ; gravel and brick fragments.	Complete borehole number is B3890R589.
SS	2.0	1.6	3 5 4				59.4 59.0				0.5 - 2.9 ft: Sandy SILT , (ML); Moderate brown (5YR3/4) changing to Grayish brown (5YR3/2) at 2.0', silt -70%, sand is fine to medium grained -30%, no plasticity, moist.	
SS	2.0	0.6	3 3 7				58.1 57.4 57.0				2.9 - 3.6 ft: Clayey SILT , (ML); Moderate brown (5YR3/4), very fine to fine grained, silt -80%, clay -20%, low plasticity, moist.	Augered to 4.0'.
SS	2.0	1.9	5 3 3 10				56.4	5			4.0 - 6.5 ft: Silty SAND , (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, no plasticity, moist.	
SS	2.0	1.7	13 17 9 14				55.0 54.5				6.5 - 7.5 ft: SAND , (SP); Light brown (5YR5/6), very fine grained, well sorted, no plasticity, moist.	Augered to 6.0'.
SS	2.0	1.7					53.5 53.1 53.0				7.5 - 7.9 ft: Sandy SILT , (ML); Dark reddish brown (10R3/4), fine to medium grained, no plasticity, moist; interlayered with Sandstone, weathered, fine grained, -80%, below 8.0'.	
							51.3 51.0	10			TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 70 Hunter Avenue	Last Update: 03-19-92	HOLE NO. R589
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R638

SITE

70 Hunter Avenue

COORDINATES

N 9719.0; E 10893.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-1-90

COMPLETED

11-1-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

1.0

ROCK (FT.)

7.0

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

6.0/75*

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

60.0

DEPTH/EL. GROUND WATER

none ATD

DEPTH/EL. TOP OF ROCK

1.0/59

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYWD)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
								60.0					
								59.8				0.0 - 1.0 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R638.
SS	1.0	0.7	8	3				59.0					Note: hole was originally numbered B3890R209.
SS	2.0	1.3	2	8				58.3					Borehole sampled and gamma-logged by TMA/Eberline Corp.
			6	15				58.0					Augered through asphalt to 1.0'.
			8					56.7					Augered to 4.0'.
SS	2.0	2.0	13	26				56.0					Augered to 6.0'.
			32										
			38										
SS	2.0	2.0	11	18									
			26										
			50										
								52.0					
TOTAL DEPTH = 8.0 FT.												Augered to total depth of 8.0'.	
												3" PVC casing inserted to 7.0' for gamma-logging.	
												PVC casing was removed after logging and hole was backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

70 Hunter Avenue

Last Update:
03-19-92

HOLE NO.

R638



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
			FUSRAP	14501	1 OF 1	R639
SITE			COORDINATES		ANGLE FROM HORIZ	BEARING
70 Hunter Avenue			N 9684.0; E 10893.0		Vertical	-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
11-2-90	11-2-90	Hydro Group, Inc.	Mobile B-80	8"	2.0	8.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
5.6/56*		0	5	NA	60.0	↓ / none ATD ↓ / NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	5	10	7			60.0				0.0 - 1.4 ft: Gravelly to Sandy SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Grayish brown (5YR3/2) at 1.1', fine to medium grained, silt -70%, sand -30%, no plasticity, moist.	Complete borehole number is B3890R639.
SS	2.0	1.3	4	10	12			58.6				2.0 - 9.2 ft: Silty SAND to Sandy SILT, (SM-ML); Dark reddish brown (10R3/4), sand -70%, silt -30%, subrounded to subangular grains, no plasticity, moist; changing to very fine to fine grained, silt -70%, sand -30%, low plasticity, wet at 6.0'.	Note: hole was originally numbered B3890R212.
SS	2.0	0.7	10	4	6			58.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	3	3	3			56.7					Augered to 4.0'.
SS	2.0	1.2	28	24	13			56.0					Augered to 6.0'.
SS	2.0	1.2	13	16				55.3	5				Augered to 8.0'.
								54.0					
								53.0					
								52.0					
								50.8					
								50.0	10			TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	70 Hunter Avenue	Last Update: 03-19-92	HOLE NO. R639
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
70 Hunter Avenue			N 9796.0; E 10906.0	14501	1 OF 1	R640
BEGUN 11-6-90			COMPLETED 11-6-90	DRILLER	DRILL MAKE AND MODEL	SIZE
4.6/77*			0	3	NA	64.0
140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:	
			none		Robert Cook	

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.5	5	4			64.0				0.0 - 1.5 ft: Sandy SILT, (ML); Dusky yellowish brown (10YR2/2) to Moderate brown (5YR3/4), fine grained, silt -70%, sand -30%, with tree roots, moist.	Complete borehole number is B3890R640.
SS	2.0	1.2	3	7			62.5				2.0 - 3.2 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), very fine grains to cobbles, silt -70%, sand -30%, no plasticity, moist.	Note: hole was originally numbered B3890R222.
SS	2.0	1.9	14	18			60.8				4.0 - 5.9 ft: SANDSTONE; Dark reddish brown (10R3/4), weathered, micaceous, blocky, iron-oxide cement.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			24	41			60.0					Augered to 4.0'.
							58.1				TOTAL DEPTH = 6.0 FT.	Augered to total depth of 6.0'.
							58.0					3" PVC casing inserted to total depth for gamma-logging.
												PVC casing was removed after logging and hole was backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	70 Hunter Avenue	Last Update: 03-19-92	HOLE NO. R640
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501-138	1 OF 1	R354				
SITE			COORDINATES				ANGLE FROM HORIZ BEARING					
79 Avenue B			N 2142.0; E 1470.0				Vertical -----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-17-90	10-17-90	Hydro Group, Inc.		Tripod		3.5"	4.0	0.0	4.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
3.2/80*		0	2	NA	35.0	/ none ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.8	2 20 20				35.0				0.0 - 0.8 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), minor pebbles, with roots, soft, slightly moist.	Complete borehole number is B3890R354.
SS	2.0	1.4	2 20 20				34.2 33.6 33.2 33.0				0.8 - 1.4 ft: Gravelly, Silty SAND, (SM); Dusky brown (5YR2/2), gravel up to 1 cm, soft, slightly moist.	Hole advanced to depth by 3" OD split spoon samplers.
							31.6 31.0				1.4 - 3.4 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained; moderately sorted above 2.9', moderately well sorted below; minor silt, gravel up to 1 cm common above 2.6', slightly layered, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
TOTAL DEPTH = 4.0 FT.											Borehole enlarged by driving 3.5" OD split spoon to depth.	
											3" PVC casing inserted for gamma-logging.	
											PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.	
											* Core recovery refers to total soil & rock sample.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination of sample.	
											Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			79 Avenue B			Last Update: 03-20-92		HOLE NO. R354	



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
79 Avenue B			FUSRAP	14501-138	1 OF 1	R355
SITE		COORDINATES			ANGLE FROM HORIZ	BEARING
10-17-90		10-17-90			Vertical	-----
BEGUN		COMPLETED		DRILLER	DRILL MAKE AND MODEL	SIZE
10-17-90		10-17-90		Hydro Group, Inc.	Tripod	3.5"
OVERBURDEN		ROCK (FT.)		TOTAL DEPTH		
4.0		0.0		4.0		
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
3.4/85*	0	2	NA	35.0	↓ / none ATD ↓ / NA	NA/NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.						
SS	2.0	1.8	2 4 4 6				35.0 34.5				0.0 - 0.5 ft: TOPSOIL; Silty Sand, (SM); Grayish brown (5YR3/2), minor pebbles, with roots, soft, slightly moist.	Complete borehole number is B3890R355.
SS	2.0	1.6	5 6 12 16				33.4 33.2 33.0				0.5 - 1.6 ft: Silty SAND, (SM); Grayish brown (5YR3/2) mottled with Moderate yellowish brown (10YR5/4), minor rounded gravel, soft, slightly moist.	Hole advanced to depth by 3" OD split spoon samplers.
							31.8 31.4 31.0				1.6 - 3.2 ft: SAND, (SW); Moderate brown (5YR4/4), fine to medium grained with minor very coarse sand, poorly to moderately sorted, slightly layered, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
											3.2 - 3.6 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), very fine grained, well sorted, minor silt, finely layered, firm, slightly moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
TOTAL DEPTH = 4.0 FT.											3" PVC casing inserted for gamma-logging.	
PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.												

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	79 Avenue B	Last Update: 03-20-92	HOLE NO. R355
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GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R356
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
79 Avenue B			N 2102.0; E 1450.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-18-90	10-18-90	Hydro Group, Inc.	Tripod		3.5"	6.0	0.0	6.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.0/83*		0	3	NA	35.0	V / none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.8	2					35.0			(Template: MYWD)	
								34.1			0.0 - 0.9 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), minor rounded pebbles, abundant roots, soft, slightly moist.	Complete borehole number is B3890R356.
SS	2.0	1.7	2					33.2			0.9 - 1.8 ft: Silty SAND, (SM); Moderate brown (5YR3/4), moderately sorted, soft, slightly moist.	Hole advanced to depth by 3" OD split spoon samplers.
			4					33.0			2.0 - 4.6 ft: SAND, (SW); Moderate brown (5YR3/4), Light brown (5YR5/6) between 3.0 - 3.7', and Moderate yellowish brown (10YR5/4) between 4.0 - 4.4'; fine grained, medium grained between 4.4 - 4.6', moderately to moderately well sorted, soft to firm with depth, moist, sharp contact with layer below.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	8					31.3				
			13					31.0				
			16					30.4	5		4.6 - 5.5 ft: Clayey SILT to Silty SAND, (ML - SP); Light brown (5YR5/6 - 5YR6/4), mottled; sand is very fine grained, clayey layers are slightly plastic, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
			11					29.5				3" PVC casing inserted for gamma-logging.
								29.0				PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
											TOTAL DEPTH = 6.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	79 Avenue B	Last Update:	03-20-92	HOLE NO.	R356
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R357

SITE

79 Avenue B

COORDINATES

N 2115.0; E 1439.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-18-90

COMPLETED

10-18-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

4.8/80*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

none ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.8			35.0				(Template: MYWD)	
					34.1				0.0 - 0.9 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), moderately sorted, roots abundant, minor pebbles, moderately firm, slightly moist.	Complete borehole number is B3890R357.
SS	2.0	1.3			33.2				0.9 - 1.8 ft: Silty SAND, (SM); Moderate brown (5YR4/4), moderately well sorted, minor gravel, firm, slightly moist.	Hole advanced to depth by 3" OD split spoon samplers.
					33.0				2.0 - 3.3 ft: SAND, (SP); Moderate reddish brown (10R4/6), fine grained with minor very coarse sand and silt, slightly coarser with depth, moderately well sorted, slightly firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7			31.7				4.0 - 5.3 ft: SAND, (SP); Light brown changing to Moderate brown (5YR4/4) at 4.6', very fine sand interlayered with medium sand, moderately well to well sorted, layers 0.2 - 0.3' thick, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
					31.0				5.3 - 5.7 ft: Clayey SILT, (ML); Light brown (5YR5/6), slightly plastic, firm, moist.	3" PVC casing inserted for gamma-logging.
					29.7	5				PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
					29.3					
					29.0					
									TOTAL DEPTH = 6.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

79 Avenue B

Last Update: 03-20-92

HOLE NO. R357



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
79 Avenue B										FUSRAP		14501-138	1 OF 1	R358
SITE										COORDINATES		ANGLE FROM HORIZ	BEARING	
10-18-90										N 2117.0; E 1451.0		Vertical	-----	
BEGUN	COMPLETED	DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-18-90	10-18-90	Hydro Group, Inc.			Tripod		3.5"	6.0	0.0	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
4.9/82*		0	3	NA	35.0	none ATD		NA/NA						
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			Stephen Knuttel								
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BL. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
SS	2.0	1.9	3 5 6 9			35.0				0.0 - 1.0 ft: TOPSOIL; Silty Sand, (SM); Grayish brown (5YR3/2), roots abundant, minor rounded gravel, soft, slightly moist.	Complete borehole number is B3890R358.			
SS	2.0	1.6	7 11 15 14			33.1 33.0 32.1				1.0 - 2.9 ft: SAND, (SM); Moderate brown (5YR4/4), with silt and gravel up to 2, firm, slightly moist.	Hole advanced to depth by 3" OD split spoon samplers.			
SS	2.0	1.4	12 16 20 16			31.4 31.0 30.6 30.1 29.6 29.0	5			2.9 - 3.6 ft: SAND, (SP); Grayish orange (10YR7/4), fine grained, moderately well sorted, firm, slightly moist. 4.0 - 4.4 ft: SAND, (SW); Moderate brown (5YR3/4); fine to medium grained, with abundant very coarse grains, rounded; poorly sorted, minor roots, firm, moist. 4.4 - 4.9 ft: Clayey SILT to SAND, (ML - SW); silt is Pale yellowish brown (10YR6/2); sand is Moderate brown (5YR4/4), fine grained; slightly plastic, firm, moist. 4.9 - 5.4 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), medium grained with common rounded very coarse grains, poorly sorted, coarse layering present, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging.			
										TOTAL DEPTH = 6.0 FT.	PVC casing was removed after logging and hole was groutec to -1' below surface and remaining hole backfilled with drilling spoils.			
											* Core recovery refer to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).			

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
79 Avenue B

Last Update: 03-20-92
HOLE NO. R358



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R359

SITE

79 Avenue B

COORDINATES

N 2117.0; E 1471.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-18-90

COMPLETED

10-18-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

4.0

ROCK (FT.)

0.0

TOTAL DEPTH

4.0

CORE RECOVERY (FT./%)

3.2/80*

CORE BOXES

0

SAMPLES

2

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

none ATD / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLDS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.				
SS	2.0	1.7	2 4 5				35.0			
							33.7			
							33.0			
SS	2.0	1.5	5 4 14 19				32.3			
							31.5			
							31.0			

(Template: MYMD)

DESCRIPTION AND CLASSIFICATION

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

0.0 - 1.3 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), with roots, minor gravel, soft, slightly moist.

Complete borehole number is B3890R359.

1.3 - 2.7 ft: Silty SAND, (SM); Light brown (5YR5/6), moderately well sorted, firm, slightly moist.

Hole advanced to depth by 3" OD split spoon samplers.

2.7 - 3.5 ft: Clayey SILT to Silty SAND, (ML - SM); Moderate yellowish brown (10YR5/4) to Moderate brown (5YR4/4), minor roots, firm, moist.

Borehole sampled and gamma-logged by TMA/Eberline Corp.

TOTAL DEPTH = 4.0 FT.

Borehole enlarged by driving 3.5" OD split spoon to depth.

3" PVC casing inserted for gamma-logging.

PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER

SITE

79 Avenue B

Last Update: 03-20-92

HOLE NO.

R359



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501-138** SHEET NO.: **1 OF 1** HOLE NO.: **R360**

SITE: **79 Avenue B** COORDINATES: **N 2125.0; E 1470.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-18-90** COMPLETED: **10-18-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Tripod** SIZE: **3.5"** OVERBURDEN: **4.0** ROCK (FT.): **0.0** TOTAL DEPTH: **4.0**

CORE RECOVERY (FT./%) **3.0/75%** CORE BOXES: **0** SAMPLES: **2** EL. TOP CASING: **NA** GROUND EL.: **35.0** DEPTH/EL. GROUND WATER: **none ATD** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	2				35.0				(Template: MYWD)	
							33.9				0.0 - 1.1 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), abundant roots, minor gravel, soft, slightly moist.	Complete borehole number is B3890R360.
							33.4				1.1 - 1.6 ft: Silty SAND, (SM); Light brown (5YR5/6), poorly sorted, moderately firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.4	8 15 18				33.0				2.0 - 3.4 ft: SAND, (SW); Light brown (5YR5/6), fine grained, moderately sorted; with layers of medium sand, moderately well sorted; minor pebbles up to 5 mm between 2.0 - 2.5'; firm, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							31.5					Borehole enlarged by driving 3.5" OD split spoon to depth.
							31.0					3" PVC casing inserted for gamma-logging.
												PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
												* Core recovery refers to total soil & rock sample.
												Ground elevation estimated from site topographic map.
												Description & classification by visual examination of sample.
												Colors from "Rock-Color Chart" (GSA, 1948).

TOTAL DEPTH = 4.0 FT.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **79 Avenue B** Last Update: **03-20-92** HOLE NO.: **R360**



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R361
SITE 79 Avenue B		COORDINATES N 2102.0; E 1429.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 10-18-90	COMPLETED 10-18-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 5.3/88*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel	

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.9	2 3				35.0 34.5		<p>(Template: MYWD)</p> <p>0.0 - 0.5 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), abundant roots, minor gravel, soft, slightly moist.</p> <p>0.5 - 1.9 ft: Silty SAND to SAND, (SM-SW); Moderate brown (5YR4/4), Grayish brown (5YR3/2) between 1.2 - 1.4'; moderately sorted, soft, moist.</p> <p>2.0 - 4.7 ft: SAND, (SW); Light brown (5YR5/6) changing to Moderate brown (5YR3/4) at 2.9', sharp contact; very fine grained with minor silt grading with depth to medium sand with some very coarse grains, moderately well sorted within the layers, firm, moist.</p> <p>4.7 - 5.7 ft: SAND, (SP); Pale yellowish brown (10YR6/2), very fine sand interlayered with fine sand, well sorted within the layers, firm, moist.</p>	<p>Complete borehole number is B3890R361.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted for gamma-logging.</p> <p>PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.</p>	
SS	2.0	1.7	3 5 7				33.1 33.0				
SS	2.0	1.7	10 12 12 12				31.3 31.0 30.3 29.3 29.0		5		

TOTAL DEPTH = 6.0 FT.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 79 Avenue B	Last Update: 03-20-92	HOLE NO. R361
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R362
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
79 Avenue B			N 2101.0; E 1375.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-18-90	10-18-90	Hydro Group, Inc.	Tripod		3.5"	4.0	0.0	4.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.2/80*		0	2	NA	35.0	/ none ATD		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	LOSS IN G.P.M	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						P.S.F.	TIME IN MIN.						
SS	2.0	1.5	2					35.0				0.0 - 1.3 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), roots abundant, large root between 0.8 - 0.9', minor pebbles, soft, slightly moist.	Complete borehole number is B3890R362.
			3					33.7				1.3 - 3.0 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained, moderately sorted, minor silt, firm, slightly moist, gradational contact with layer below.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.7	3					32.0				3.0 - 3.7 ft: SAND, (SP); Moderate brown (5YR4/4), fine grained, well sorted, soft, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			5					31.3					
			8					31.0					
TOTAL DEPTH = 4.0 FT.													

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	79 Avenue B	Last Update:	03-20-92	HOLE NO.	R362
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R363

SITE

79 Avenue B

COORDINATES

N 2125.0; E 1375.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-18-90

COMPLETED

10-18-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

5.3/88*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

↓ / none ATD

↓ / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.8	2 2 4 8				35.0			(Template: NYLD)	
							34.3			0.0 - 0.7 ft: TOPSOIL ; Silty Sand, (SM); Grayish brown (5YR5/2), moderately sorted, with roots, soft, moist.	Complete borehole number is B3890R363.
SS	2.0	1.6	4 5 4 9				33.2 33.0			0.7 - 1.8 ft: SAND , (SW); Moderate brown (5YR3/4), minor silt, moderately sorted, soft, slightly moist.	Hole advanced to depth by 3" OD split spoon samplers.
							31.4 31.0			2.0 - 3.6 ft: SAND , (SW); Light brown (5YR5/6), fine grained, moderately sorted, varying silt content, clean at bottom, moderately firm, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.9	8 12 12 14				29.1 29.0	5		4.0 - 5.9 ft: SAND , (SP); Moderate yellowish brown (10YR5/4), fine grained, well sorted, finely layered between 5.0 - 5.9', firm, moist.	
										TOTAL DEPTH = 6.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
											* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

79 Avenue B

Last Update: 03-20-92

HOLE NO. R363



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501-138** SHEET NO.: **1 OF 1** HOLE NO.: **R428**

SITE: **79 Avenue B** COORDINATES: **N 2122.0; E 1465.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **1-2-91** COMPLETED: **1-2-91** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Tripod** SIZE: **3.5"** OVERBURDEN: **4.0** ROCK (FT.): **0.0** TOTAL DEPTH: **4.0**

CORE RECOVERY (FT./%): **3.2/80*** CORE BOXES: **0** SAMPLES: **2** EL. TOP CASING: **NA** GROUND EL.: **35.0** DEPTH/EL. GROUND WATER: **NA / NA** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. B.S.T.	TIME MIN.						
SS	2.0	1.6	5 6 7 9				35.0				0.0 - 1.3 ft: TOPSOIL; Silty Sand, (SM); Moderate brown (5YR3/4), roots abundant, poorly sorted, firm, moist.	Complete borehole number is B3890R428.
SS	2.0	1.6	10 18 28 31				33.7 33.4 33.0 32.6				1.3 - 2.4 ft: Silty SAND, (SM); Moderate brown (5YR4/4), moderately sorted, minor clay, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
							31.4 31.0				2.4 - 3.6 ft: SAND, (SP); Light brown (5YR5/6) changing to Moderate brown (5YR4/4) at 3.3', very fine to fine grained, moderately well sorted; layer of medium sand, well sorted, clean, between 3.3 - 3.6'; firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
TOTAL DEPTH = 4.0 FT.												Borehole enlarged by driving 3.5" OD split spoon to depth.
												3" PVC casing inserted for gamma-logging.
												PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **79 Avenue B** Last Update: **05-20-92** HOLE NO.: **R428**
HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO. 14501-138

SHEET NO. 1 OF 1

HOLE NO. R429

SITE

79 Avenue B

COORDINATES

N 2118.0; E 1457.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

1-2-91

COMPLETED

1-2-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

4.1/68*

CORE BOXES

SAMPLES

0

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

↓ / -5' ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	4 4 6 10				35.0				(Template: MYWD)	
							34.1				0.0 - 0.9 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), sand is fine to medium grained, poorly sorted, minor clay, abundant roots, firm, moist.	Complete borehole number is B3890R429.
SS	2.0	1.5	15 25 25 32				33.0 32.6				0.9 - 2.4 ft: Silty SAND, (SM); Light brown (5YR5/6), sand is fine grained with minor coarse sand, poorly sorted, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.1	7 15 30 30				31.5 31.0 29.9 29.0	5			2.4 - 5.1 ft: SAND, (SP); Pale brown (5YR5/2) to Pale yellowish brown (10YR6/2) changing to Moderate brown (5YR4/4) to Light brown (5YR5/6) at 3.3' very fine to fine grained, moderately well sorted; layer of medium sand, clean, between 3.3 - 4.3'; firm, moist, wet below 4.3'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
TOTAL DEPTH = 6.0 FT.											Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

79 Avenue B

Last Update: 03-20-92

HOLE NO. R429



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R337
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
90 Avenue C			N 2114.0; E 1568.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-12-90	10-12-90	Hydro Group, Inc.	Tripod		3.5"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.2/87*		0	3	NA	35.0	↓ / none ATD ↓ / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Stephen Knuttel						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.						
SS	2.0	1.6	2 4				35.0 34.5				0.0 - 0.5 ft: TOPSOIL; Sandy Silt, (ML); Grayish black (N2), with roots, gradational contact.	Complete borehole number is B3890R337.
SS	2.0	1.7	2 6 13				33.4 33.0 32.3				0.5 - 1.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4), minor gravel, firm, moist.	
SS	2.0	1.9	13 13 14 12				31.3 31.0 30.0				2.0 - 2.7 ft: SAND, (SW); Pale yellowish orange (10YR8/6), fine grained, poorly sorted, minor silt, soft, moist to wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							29.1 29.0	5			2.7 - 5.0 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), minor gravel up to 1 cm, firm, moist.	
											5.0 - 5.9 ft: Clayey SILT, (ML); Pale reddish brown (10R5/4) mottled with Light brown (5YR5/6) and spotted in places with Black (N1), minor layering, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
											TOTAL DEPTH = 6.0 FT.	3" PVC casing inserted for gamma-logging.
												PVC casing was removed after logging and hole was backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	90 Avenue C	Last Update: 03-20-92	HOLE NO. R337
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R343
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
90 Avenue C			N 2110.0; E 1479.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-16-90	10-16-90	Hydro Group, Inc.		Tripod	3.5"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.0/83*		0	3	NA	35.0	V / none ATD NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.5	2			35.0				
			2			34.7			0.0 - 0.3 ft: TOPSOIL; Silty SAND, (SM); Grayish black (N2), with roots, minor gravel, soft, moist.	Complete borehole number is B3890R343.
SS	2.0	1.8	2			33.5			0.3 - 1.5 ft: SAND, (SW); Moderate brown (5YR3/4), fine grained, poorly sorted, with silt and minor gravel, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
			12			33.0			2.0 - 4.5 ft: SAND, (SP); Moderate yellowish brown (10YR5/4) changing to Moderate reddish brown (10R4/6) at 4.0; fine grained grading to medium below 4.0', with minor coarse grains and small pebbles; moderately well sorted, firm, moist, sharp contact.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	15			31.2			4.5 - 5.7 ft: Silty SAND, (SM); Moderate brown (5YR4/4) mottled in places with Pale yellowish brown (10YR6/2) and Grayish orange (10YR7/4), sand is very fine, well sorted, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
			20			30.5				3" PVC casing inserted for gamma-logging.
			20			29.3				PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
			15			29.0				
									TOTAL DEPTH = 6.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE 90 Avenue C Last Update: 03-20-92 HOLE NO. R343
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R344
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
90 Avenue C			N 2103.0; E 1478.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-16-90	10-16-90	Hydro Group, Inc.	Tripod		3.5"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.7/62*		0	3	NA	35.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	2 2 2				35.0				0.0 - 1.2 ft: TOPSOIL; Sandy Silt, (ML); Brownish black (5YR2/1), with roots, soft, moist.	Complete borehole number is B3890R344. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	0.8	3 5 10 12				33.8 33.5 33.0 32.8 32.2				1.2 - 2.3 ft: FILL. 1.2 - 1.5 ft: Slag, Black (N1) and Very light gray (N8), salt and pepper colored; material is hard, chalky, coarse sand size up to 1 cm. 2.0 - 2.2 ft: Cement fragments.	
SS	2.0	1.4	13 15 13 17				31.0				2.2 - 2.8 ft: Silty SAND, (SM); Dark yellowish orange (10YR6/6) mottled with Moderate reddish brown (10R4/6) and Moderate brown (5YR4/4), sand is very fine grained.	
							29.6 29.0	5			4.0 - 5.4 ft: SAND, (SP); Moderate brown (5YR4/4); fine sand interlayered with medium sand, some pebbles up to 1 cm within the medium sand layers; layers 0.2 - 0.4' thick, firm, moist.	
TOTAL DEPTH = 6.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	90 Avenue C	Last Update: 03-20-92	HOLE NO. R344
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R345
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
90 Avenue C			N 2114.0; E 1497.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-16-90	10-16-90	Hydro Group, Inc.	Tripod		3.5"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.8/80*		0	3	NA	35.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	1				35.0				0.0 - 1.6 ft: TOPSOIL; Silty Sand, (SM); Grayish brown (5YR3/2) to Brownish black (5YR2/1), with roots, minor gravel, soft, moist.	Complete borehole number is B3890R345. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
			2				33.4						
			2				33.0				2.0 - 3.7 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), soft, moist.		
SS	2.0	1.7	2										
			3										
			3										
SS	2.0	1.5	9				31.3				4.0 - 4.4 ft: Sandy SILT, (ML); Dark yellowish orange (10YR6/6), low plasticity, soft, moist.		
			14				30.6						
			15				30.1				4.4 - 4.9 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), fine grained, moderately well sorted, firm, moist, sharp contact.		
			18				29.6						
							29.0				4.9 - 5.4 ft: Clayey SILT, (ML); Pale yellowish orange (10YR8/6) mottled with Dark yellowish orange (10YR6/6) and Grayish orange (10YR7/4), low plasticity, very firm, moist.		
TOTAL DEPTH = 6.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	90 Avenue C	Last Update: 03-20-92	HOLE NO. R345
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

SHEET NO.

HOLE NO.

14501-138

1 OF 1

R346

SITE

90 Avenue C

COORDINATES

N 2100.0; E 1500.0

ANGLE FROM HORIZ. BEARING

Vertical

BEGUN

COMPLETED

DRILLER

DRILL MAKE AND MODEL

SIZE

OVERBURDEN

ROCK (FT.)

TOTAL DEPTH

10-16-90

10-16-90

Hydro Group, Inc.

Tripod

3.5"

10.0

0.0

10.0

CORE RECOVERY (FT./%)

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

7.1/71*

0

5

NA

35.0

-6.5' ATD

NA/NA

SAMPLE HAMMER WEIGHT/FALL

CASING LEFT IN HOLE: DIA./LENGTH

LOGGED BY:

140 lbs/30 in

none

Stephen Knuttel

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOCKS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.4	12				35.0						
			2				34.8				0.0 - 0.5 ft: ASPHALT; over sand.	Complete borehole number is B3890R346. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
			2				34.1				0.5 - 0.9 ft: Silty SAND, (SM); Grayish brown (5YR3/2), soft, moist.		
SS	2.0	1.3	2				33.0				0.9 - 5.3 ft: SAND, (SP); Moderate brown (5YR4/4), Light brown (5YR5/6) between 2.0 - 3.3; fine to medium grained, graded between 4.0 - 5.3', moderately well sorted, minor gravel up to 1 cm between 0.9 - 3.3', soft to firm with depth, moist, sharp contact with layer below.		
			3				31.7						
SS	2.0	1.5	5				31.0						
			5				29.7	5					
			8				29.5						
			10				29.0						
SS	2.0	1.4	17				28.2				5.3 - 6.8 ft: SILT, (ML); Dark yellowish orange (10YR6/6); with layers of Sand, Moderate yellowish brown (10YR5/4), fine grained between 6.0 - 6.3' and Pale brown (5YR5/2), medium grained between 6.7 - 6.8'; slightly plastic, firm, moist to wet.		
			17				27.6						
			16				27.0				6.8 - 9.5 ft: Clayey SILT, (ML); Moderate brown (5YR4/4), slightly mottled; slightly plastic, firm, moist.		
			16				27.0						
SS	2.0	1.5	12				25.5						
			12				25.0						
			15										
			17										
								10			TOTAL DEPTH = 10.0 FT.		

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
 HX = HAND AUGER; 0 = OTHER

90 Avenue C

Last Update: 03-20-92

HOLE NO. R346



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501-138	1 OF 1	R348			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
90 Avenue C			N 2092.0; E 1512.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-16-90	10-16-90	Hydro Group, Inc.		Tripod		3.5"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
4.3/72*		0	3	NA	35.0	none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.3	5 3 2				35.0 34.7 33.7 33.0 31.5 31.0 30.8 29.9 29.5 29.0		(Template: MYLO) 0.0 - 0.3 ft: ASPHALT, over sand and gravel. 0.3 - 1.3 ft: Silty SAND, (SM); Brownish black (5YR2/1), minor gravel, soft, slightly moist. 2.0 - 4.2 ft: SAND, (SP); Moderate brown (5YR4/4), fine grained, moderately well sorted, firm, moist. 4.2 - 5.1 ft: Silty SAND interlayered with SAND, (SM-SP); Moderate brown (5YR4/4), sand is fine grained, moderately well sorted within the layers, firm, moist. 5.1 - 5.5 ft: Sandy SILT, (ML); Dark yellowish orange (10YR6/6), slightly mottled with Dark reddish brown (10R3/4); with stringers of sand, firm, slightly moist. TOTAL DEPTH = 6.0 FT.	Complete borehole number is B3890R348. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.	
SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER				SITE		90 Avenue C		Last Update: 03-20-92	HOLE NO. R348		



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501-138	1 OF 1	R349				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
90 Avenue C			N 2088.0; E 1528.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-16-90	10-16-90	Hydro Group, Inc.		Tripod		3.5"	4.0	0.0	4.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
2.9/73*		0	2	NA	35.0	/ none ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	8 4 4				35.0 34.8 33.6 33.0 32.5 31.5 31.0				(Template: MYMD) 0.0 - 0.4 ft: ASPHALT; over sand and gravel, Medium gray (N6). 0.4 - 1.4 ft: SAND, (SW); Moderate brown (5YR3/4), fine grained. 2.0 - 2.5 ft: Silty SAND, (SM); Grayish orange (10YR7/4), sand is very fine grained, well sorted, soft, moist. 2.5 - 3.5 ft: SAND, (SW); Light brown (5YR5/6) changing to Pale yellowish brown (10YR6/2) at 2.9' and to Moderate reddish brown (10R4/6) at 3.0'; fine grained changing to medium grained at 2.9', poorly to moderately sorted; well sorted between 2.9 - 3.0'; minor silt and gravel, firm, moist. TOTAL DEPTH = 4.0 FT.	Complete borehole number is B3890R349. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
SS	2.0	1.5	3 5 10 12									* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		90 Avenue C		Last Update: 03-20-92		HOLE NO. R349		



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R350
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
90 Avenue C			N 2089.0; E 1558.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-16-90	10-16-90	Hydro Group, Inc.	Tripod		3.5"	4.0	0.0	4.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.2/80*		0	2	NA	35.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.						
SS	2.0	1.8	10 3 4				35.0 34.8 34.2 33.7 33.2 33.0				0.0 - 0.8 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R350.
SS	2.0	1.4	3 4 25 25				32.3 32.0 31.6 31.0				0.8 - 1.3 ft: Silty SAND, (SM); Moderate brown (5YR5/4), with minor gravel, poorly sorted, soft, moist. 1.3 - 1.8 ft: Sandy SILT, (ML); Grayish brown (5YR5/2), soft, moist. 2.0 - 2.7 ft: Silty SAND, (SM); Grayish orange (10YR7/4), sand is very fine grained, well sorted, soft, moist. 2.7 - 3.0 ft: SAND, (SW); Light brown (5YR5/6), fine grained, minor silt to coarse sand, firm, moist. 3.0 - 3.4 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), slightly mottled; sand is fine grained with some very coarse grains, firm, moist.	
TOTAL DEPTH = 4.0 FT.												

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	90 Avenue C	Last Update: 03-20-92	HOLE NO. R350
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
90 Avenue C			N 2,098.0; E 1,582.0	14501	1 OF 1	R351
SITE			COORDINATES	ANGLE FROM HORIZ		BEARING
10-17-90			10-17-90	Hydro Group, Inc.	Tripod	3.5"
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN
10-17-90		10-17-90	Hydro Group, Inc.	Tripod	3.5"	6.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
4.8/80*		0	3	NA	35.0	↓ / none ATD ↓ / NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLMS. % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.9	2 3 4 6				35.0 34.4			0.0 - 0.6 ft: TOPSOIL; Sandy Silt, (ML); Grayish black (N2), with roots, soft, moist.	Complete borehole number is B3890R351. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
SS	2.0	1.3	3 4 7 12			33.1 33.0			0.6 - 3.0 ft: Sandy SILT, (ML); Brownish black (5YR2/1) changing to Moderate brown (5YR4/4) at 1.9', minor roots between 0.6 - 1.3', minor gravel, soft, moist.		
SS	2.0	1.6	11 15 19 20			32.0 31.7 31.0 30.8 30.4			3.0 - 4.2 ft: Gravelly, Sandy SILT, (ML); Brownish black (5YR2/1), with fragment of red clay pipe.		
						29.4 29.0		5	4.2 - 4.6 ft: Clayey SILT, (ML); Light brown (5YR5/6) mottled with Grayish orange pink (5YR7/2), minor sand, slightly plastic, firm, moist.		
									4.6 - 5.6 ft: SAND, (SP); Moderate brown (5YR4/4), fine grained, moderately well sorted, layers 0.2 - 0.3' thick, some layers with higher silt content, firm, moist.		
TOTAL DEPTH = 6.0 FT.											

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	90 Avenue C	Last Update: 10-05-92	HOLE NO. R351
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

C352

SITE

90 Avenue C

COORDINATES

N 2103.0; E 1482.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

10-17-90

COMPLETED

10-17-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

ROCK (FT.)

0.0

TOTAL DEPTH

4.0

CORE RECOVERY (FT./%)

3.3/83*

CORE BOXES

0

SAMPLES

2

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

7 / none ATD
NA / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOMS % CORE RECOVERY	LOSS IN G.P.M	WATER PRESSURE TESTS PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.6	3 3044 3				35.0 34.6 34.2 33.6			0.0 - 0.4 ft: TOPSOIL; Sandy Silt, (ML); Brownish black (5YR2/1), with roots, soft, moist.	Complete borehole number is B3890C352.
SS	2.0	1.7	2 3 6 13				33.0 32.4			0.4 - 0.7 ft: FILL; Slag, Black (N1) and Very light gray (N8), salt and pepper colored; material is hard, chalky, coarse sand size up to 1 cm, mixed with soil above.	Hole advanced to depth by 3" OD split spoon samplers.
							31.3 31.0			0.7 - 1.6 ft: Silty SAND to Sandy SILT (SM - ML); Moderate brown (5YR4/4 - 5YR3/4), minor roots and gravel, moderately well sorted below 1.4, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
										2.0 - 2.6 ft: Silty SAND, (SM); Dark yellowish orange (10YR6/6), sand is very fine grained, well sorted, firm, slightly moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
										2.6 - 3.7 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained, with some very coarse grains, moderately sorted, some layering, firm, slightly moist.	3" PVC casing inserted for gamma-logging.
										TOTAL DEPTH = 4.0 FT.	
										PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; 0 = OTHER

SITE

90 Avenue C

Last Update: 03-20-92

HOLE NO. C352



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
90 Avenue C			FUSRAP	14501-138	1 OF 1	C353
SITE			COORDINATES	ANGLE FROM HORIZ		BEARING
10-17-90			N 2103.0; E 1477.0	Vertical		-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
10-17-90	10-17-90	Hydro Group, Inc.	Tripod	3.5"	6.0	0.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
3.8/63*	0	3	NA	35.0	none ATD	NA/NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOMS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	2	2				35.0				0.0 - 1.2 ft: TOPSOIL; Sandy Silt, (ML); Brownish black (5YR2/1), with roots, soft, moist.	Complete borehole number is B3890C353. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	7	9				33.8				1.2 - 2.8 ft: FILL.	
			12	21				33.6				1.2 - 2.6 ft: Slag, Black (N1) and Very light gray (N8), salt and pepper colored; material is hard, chalky, coarse sand size up to 1 cm.	
SS	2.0	1.1	16	19				32.2				2.6 - 2.8 ft: Cement fragments.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
			21	24				31.6				2.8 - 5.1 ft: SAND, (SP); Moderate brown (5YR4/4); fine sand interlayered with medium sand, some pebbles up to 1 cm within the medium sand layers; layers 0.2 - 0.4' thick, firm, moist.	
								31.0	5				
								29.9					
								29.0					
TOTAL DEPTH = 6.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; SITE 90 Avenue C Last Update: 03-20-92 HOLE NO. C353
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R426	
SITE	90 Avenue C		COORDINATES		N 2105.0; E 1501.0		ANGLE FROM HORIZ	BEARING
BEGUN	1-2-91	COMPLETED	1-2-91	DRILLER	Hydro Group, Inc.		Vertical	-----
DRILL MAKE AND MODEL		SIZE		OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
Tripod		3.5"		8.0	0.0	8.0		
CORE RECOVERY (FT./%)	5.8/73*	CORE BOXES	0	SAMPLES	4	EL. TOP CASING	NA	
GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
35.0		-6' ATD		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:				
140 lbs/30 in		none		Stephen Knuttel				

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.5	4	4				35.0					Complete borehole number is B3890R426. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 7.9' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			6					34.4				0.0 - 0.6 ft: Silty SAND, (SM); Grayish brown (5YR3/2), sand is fine to medium grained, moderately sorted, with minor slag and pebbles, moderately firm, moist.	
SS	2.0	1.6	2	7				33.0				0.6 - 4.6 ft: Clayey SAND to Silty SAND, (SC-SM); Moderate brown (5YR4/4 - 5YR3/4) changing to Dark yellowish orange (10YR6/6) at 2.0', mottled with Grayish orange (10YR7/4) between 2.7 - 4.6; sand is very fine to fine grained, poorly to moderately sorted, minor rounded pebbles up to 1 cm between 0.6 - 2.7', firm, moist.	
SS	2.0	1.1	2	7				31.4					
			5	14				30.4					
			7					29.9	5			4.6 - 6.5 ft: SAND, (SP); Moderate brown (5YR4/4); fine grained, moderately well sorted, clean, firm, moist.	
SS	2.0	1.6	2	9				29.0					
			11					28.5					
			15					27.4					
								27.0				6.5 - 7.6 ft: SILT, (ML); Moderate brown (5YR4/4) mottled with Moderate yellowish brown (10YR5/4) and Light brown (5YR5/6), with very fine sand, firm, wet.	
TOTAL DEPTH = 8.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	90 Avenue C	Last Update: 03-20-92	HOLE NO.	R426
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GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501-138
 SHEET NO.: 1 OF 1
 HOLE NO.: R427

SITE: 90 Avenue C
 COORDINATES: N 2085.0; E 1500.0
 ANGLE FROM HORIZ: Vertical

BEGUN: 1-2-91
 COMPLETED: 1-2-91
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Tripod
 SIZE: 3.5"
 OVERBURDEN: 6.0
 ROCK (FT.): 0.0
 TOTAL DEPTH: 6.0

CORE RECOVERY (FT./%): 4.1/68%
 CORE BOXES: 0
 SAMPLES: 3
 EL. TOP CASING: NA
 GROUND EL.: 35.0
 DEPTH/EL. GROUND WATER: 7 / none ATD
 DEPTH/EL. TOP OF ROCK: NA/NA

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Stephen Knuttel

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.0	10					35.0				(Template: MYWD)	
			9					34.8				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R427.
			6					34.0				0.2 - 0.5 ft: FILL; Slag, Black (N1) and Light gray (N7), salt and pepper colored; material is hard, chalky, fine to medium sand size.	
SS	2.0	1.5	4					33.0				0.5 - 3.5 ft: Silty SAND, (SM); Moderate brown (5YR4/4), fine to medium grained, with some rounded very coarse sands grains, moderately sorted, dirty, firm, moist.		Hole advanced to depth by 3" OD split spoon samplers.
			6					31.5					Borehole sampled and gamma-logged by TMA/Eberline Corp.
			25					31.0				4.0 - 5.3 ft: Silty SAND interlayered with SAND, (SM-SP); Moderate brown (5YR4/4), sand is very fine to fine grained, moderately well sorted within the layers, firm, moist.	
SS	2.0	1.6	16					29.7	5			5.3 - 5.6 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), sand is very fine, well sorted, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
			31					29.4					
			30					29.0					3" PVC casing inserted to 6.0' for gamma-logging.
			31										PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 6.0 FT.													

* Core recovery refers to total soil & rock sample.
 Ground elevation estimated from site topographic map.
 Description & classification by visual examination of sample.
 Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: 90 Avenue C
 HX = HAND AUGER; O = OTHER
 Last Update: 03-20-92
 HOLE NO.: R427



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO. 14501-138

SHEET NO. 1 OF 1

HOLE NO. R436

SITE

Avenue C (near 90)

COORDINATES

N 2105.0; E 1592.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

1-10-91

COMPLETED

1-10-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

3.0

ROCK (FT.)

0.0

TOTAL DEPTH

3.0

CORE RECOVERY (FT./%)

1.3/43*

CORE BOXES

0

SAMPLES

2

SEL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

none

ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.							
									35.0					
SS	1.5	0.8	6	10	12				34.8				0.0 - 0.5 ft: ASPHALT; over sand.	Complete borehole number is B3890R436.
									33.7				0.5 - 2.5 ft: Clayey SILT, (ML); Light brown (5YR5/6); with minor gravel of mixed composition, up to 0.2', between 2.0 - 2.5'; firm, moist.	Augered through asphalt to 0.5'.
SS	1.0	0.5	18-27	50/0*					33.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
									32.5					Augered to 2.0'. Spoon refusal at 3.0'.
									32.0					Augered to 3.0'; auger would not advance with minimum pressure, drilling stopped because of possible underground utilities.
TOTAL DEPTH = 3.0 FT.													3" PVC casing inserted to 3.0' for gamma-logging.	
PVC casing was removed after logging and hole was backfilled with drilling spoils.														

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

Avenue C (near 90)

Last Update: 03-20-92

HOLE NO. R436



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R301

SITE

108 Avenue E

COORDINATES

N 2060.0; E 2016.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

9-27-90

COMPLETED

9-27-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3"

OVERBURDEN

4.0

ROCK (FT.)

0.0

TOTAL DEPTH

4.0

CORE RECOVERY (FT./%)

3.2/80*

CORE BOXES

SAMPLES

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

7 / none ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Richard Migues

(Template: MYWD)

DESCRIPTION AND CLASSIFICATION

NOTES ON:
WATER LEVELS,
WATER RETURN,
CHARACTER OF
DRILLING, ETC.

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	LOSS IN G.P.M.	WATER TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE
						PRESS. P.S.F.	TIME MIN.				
SS	2.0	1.3	nr					35.0			
			13								
			20								
			22								
SS	2.0	1.9	12					33.7			
			17					33.0			
			17					32.1			
			12					31.1			
								31.0			

0.0 - 2.9 ft: Clayey, Silty SAND, (SM); Dark reddish brown (10R5/4), sand is fine to medium grained, some pebbles up to 0.25" diameter

2.9 - 3.9 ft: Silty SAND and Clayey SILT (SM-ML); Light brownish gray (5YR6/1) mottled with Moderate yellowish brown (10YR5/4); interlayered with bands of Clayey Silt, Brownish black (5YR2/1) with Black (N1) streaks; sand is fine to medium grained.

TOTAL DEPTH = 4.0 FT.

Complete borehole number is B3890R301.
Hole advanced to depth by 3" OD split spoon samplers.
Borehole sampled by TMA/Eberline Corp.
Coring stopped because of skewed hole; offset to Hole R302.
Hole backfilled with drilling spoils.

nr = not recorded.
* Core recovery refers to total soil & rock sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

108 Avenue E

Last Update: 03-20-92

HOLE NO. R301



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R302

SITE

108 Avenue E

COORDINATES

N 2059.0; E 2017.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

9-27-90

COMPLETED

9-28-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

6"

OVERBURDEN

12.0

ROCK (FT.)

0.0

TOTAL DEPTH

12.0

CORE RECOVERY (FT./%)

4.9/61*

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

7 / -11' ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Richard Miguez

(Template: NYWD)

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.							
O	4.0	nr	nr						35.0				0.0 - 4.0 ft: See Borehole R301.	Complete borehole number is B3890R302.
SS	2.0	1.4	20						31.0				4.0 - 11.0 ft: Silty SAND, (SM); Light brown (5YR5/6) mottled with Pale yellowish brown (10YR6/2); sand is fine to medium grained, grain size increasing with depth to fine to coarse with decreased silt content; sandstone fragments and sand, Dark reddish brown (10R3/4), between 4.0 - 4.1'; stringers of Sandy Clay, Brownish gray (5YR4/1), between 4.5 - 5.4'; layers of Sandy, Silty Clay and Silty, Clayey Sand, Moderate brown (5YR4/4) mottled with Light grayish brown (5YR6/1), between 6.0 - 7.0'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			10						29.6	5				
			28						29.0					
SS	2.0	1.0	4						28.0					
			17						27.0					
SS	2.0	1.5	4						25.5					
			12						25.0	10				
			10						24.0					Borehole enlarged by driving 6" steel casing to depth.
			11						23.0					
			9										TOTAL DEPTH = 12.0 FT.	Steel casing removed and 3" PVC casing inserted for gamma-logging.
														PVC casing was removed after logging and hole was backfilled with drilling spoils.

nr = not recorded.
 * Core recovery refers to total soil & rock sample.
 Ground elevation estimated from site topographic map.
 Description & classification by visual examination of sample.
 Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
 HX = HAND AUGER; O = OTHER

SITE
 108 Avenue E
 Last Update: 03-20-92

HOLE NO.
 R302



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R303
SITE 108 Avenue E		COORDINATES N 2075.0; E 2000.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 10-1-90	COMPLETED 10-1-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 6"	OVERBURDEN 8.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 6.5/81*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER -6' ATD / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: R. L. Sayre		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.5	2 3 7 8			35.0			0.0 - 2.3 ft: SAND, (SW); Moderate brown (5YR4/4) to Dark reddish brown (10R3/4), with scattered sandstone pebbles; very dark brown organic soil between 2.0 - 2.3'.	Complete borehole number is B3890R303.
SS	2.0	1.6	6 10 10 10			33.5 33.0 32.7			2.3 - 6.0 ft: SAND, (SP); light grayish brown [10YR7/2] mottled with Medium gray (N5) and light brown [10YR5/6], medium to coarse grained, gradational contact with layer below.	Hole advanced by driving 6" steel casing after each run of the 3" OD split spoon sampler; then retrieving slough from inside the casing with the sampler.
SS	2.0	2.0	12 18 20 20			31.4 31.0	5		6.0 - 7.4 ft: SAND, (SW); light brown [5YR5/5], medium to coarse grained, trace silt, dense, wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	20 15 17 20			29.0 27.6 27.0			TOTAL DEPTH = 8.0 FT.	Steel casing removed and 3" PVC casing inserted for gamma-logging.
										PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 108 Avenue E	Last Update: 03-20-92	HOLE NO. R303
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

SHEET NO.

HOLE NO.

14501-138

1 OF 1

R304

SITE

108 Avenue E

COORDINATES

N 2078.0; E 1985.0

ANGLE FROM HORIZ

BEARING

Vertical

BEGUN

10-1-90

COMPLETED

10-2-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

6"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

3.1/52*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

0

3

NA

35.0

none ATD

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

R. L. Sayre

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BL. OUTS	% CORE RECOVERY	LOSS IN G.P.M.	WATER TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.						
SS	2.0	0.0	nr					35.0				(Template: MYWD)	
SS	2.0	1.6	10					33.0				0.0 - 2.0 ft: See Borehole R305.	Complete borehole number is B3890R304.
			10					32.1				2.0 - 2.9 ft: SAND, (SW); medium yellowish orange (10YR6/4), medium grained, slightly silty, some nodular fragments near top.	Hole advanced by driving 6" steel casing after each run of the 3" OD split spoon sampler; then retrieving slough by withdrawing the casing and knocking out the plug before replacing the casing.
			12					31.6					
			12					31.4					
SS	2.0	1.5	10					31.0				2.9 - 3.4 ft: CLAY, (CL); Medium dark gray (N4) mottled with yellowish brown (10YR5/3), laminated.	
			17					29.5	5			3.4 - 5.5 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), coarse grained changing to fine grained below 4.8', dense, moist near base.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			20					29.0					
TOTAL DEPTH = 6.0 FT.												Steel casing removed and 3" PVC casing inserted for gamma-logging.	PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

108 Avenue E

Last Update: 03-20-92

HOLE NO. R304



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.								
				FUSRAP		14501-138	1 OF 1	R305								
SITE			COORDINATES				ANGLE FROM HORIZON									
108 Avenue E			N 2077.0; E 1985.0				Vertical									
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH								
10-2-90	10-2-90	Hydro Group, Inc.	Tripod		3"	2.0	0.0	2.0								
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK								
0.8/40*		0	1	NA	35.0	none ATD NA		NA/NA								
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:											
140 lbs/30 in		none			R. L. Sayre <i>[Signature]</i>											
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLDS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. TESTS	PRESS. P.S.F.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: NYWD)			
													DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	0.8	4	33.2					35.0				0.0 - 0.6 ft: Silty SAND, (SM); brown with red-brown specks, with organic matter and some pebbles (weathered sandstone).	Complete borehole number is B3890R305.		
									34.4				0.6 - 0.8 ft: SAND, (SW); mottled gray, tan, and orange-brown.	Hole sampled to 2.0' to resample interval lost in Hole R304.		
									34.2				TOTAL DEPTH = 2.0 FT.	Borehole sampled by TMA/Eberline Corp.		
									33.0					Hole backfilled with drilling spoils and sand.		
SS = SPLIT SPOON; NQ = CORE BARREL; HQ = HAND AUGER; O = OTHER													* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).			
SITE											108 Avenue E		Last Update: 03-20-92		HOLE NO. R305	



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501-138
 SHEET NO.: 1 OF 1
 HOLE NO.: R306

SITE: 108 Avenue E
 COORDINATES: N 2100.0; E 2020.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----
 BEGUN: 10-2-90
 COMPLETED: 10-2-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Tripod
 SIZE: 6"
 OVERBURDEN: 6.0
 ROCK (FT.): 0.0
 TOTAL DEPTH: 6.0
 CORE RECOVERY (FT./%): 4.6/77*
 CORE BOXES: 0
 SAMPLES: 3
 EL. TOP CASING: NA
 GROUND EL.: 35.0
 DEPTH/EL. GROUND WATER: / none ATD / NA
 DEPTH/EL. TOP OF ROCK: NA/NA
 SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: R. L. Sayre

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	nr			35.0				(Template: MYWD)	
						33.6				0.0 - 2.3 ft: SAND, (SM); Moderate brown (5YR4/4) changing to Dark reddish brown (10R3/4) at 1.2', medium grained, silty, with some gravel; grayish soil between 0.0 - 0.2'; reddish-brown (10R3/2) siltstone cobble at 1.2'; red brown soil between 2.0 - 2.3'.	Complete borehole number is B3890R306.
SS	2.0	1.8	nr			33.0				2.3 - 3.0 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2), sand is fine grained.	Hole advanced to depth by 3" OD split spoon samplers.
						32.7				3.0 - 5.4 ft: SAND, (SP); Pale yellowish brown (10YR6/2) changing to medium yellowish brown at 3.8', medium to coarse grained; siltstone pebble near top; some clayey streaks between 3.0 - 3.8'; dense, moist at 5.0'; layer of Clayey Sand, stiff, at 5.3'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	15 25 28 32			31.2					
						31.0					
						29.7	5				
						29.6					
						29.0					
TOTAL DEPTH = 6.0 FT.											Hole enlarged by driving 6" steel casing, removing it at intervals to knock out the slough, then redriving the casing until reaching total depth.
											Steel casing removed and 3" PVC casing inserted for gamma-logging.
											PVC casing was removed after logging and hole was backfilled with drilling spoils.
											nr = not recorded. * Core recovery refers to total soil & rock sample.
											Ground elevation estimated from site topographic map.
											Description & classification by visual examination of sample.
											Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: 108 Avenue E
 HX = HAND AUGER; O = OTHER

LOG Update: 03-20-92
 HOLE NO. R306



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
108 Avenue E				FUSRAP		14501	1 OF 1	R307				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
108 Avenue E			N 1,999.0; E 2,083.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-2-90	10-3-90	Hydro Group, Inc.		Tripod	6"	6.0	0.0	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
4.8/80*		0	3	NA	35.0	/ none ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			R. L. Sayre <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLDS. % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.6	2 3 3				35.0					
SS	2.0	1.7	5 7 10 10				33.4 33.0					
SS	2.0	1.5	9 17 23 25				31.3 31.0 30.2 29.5 29.0	5				
TOTAL DEPTH = 6.0 FT.												
<p>Hole enlarged by driving 6" steel casing, removing it at intervals to knock out the slough, then re-driving the casing until reaching total depth.</p> <p>Steel casing removed and 3" PVC casing inserted to 4.5' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with drilling spoils.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			108 Avenue E			Last Update: 09-22-92		HOLE NO. R307	



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
			FUSRAP	14501-138	1 OF 1	R308
SITE		COORDINATES			ANGLE FROM HORIZ	BEARING
108 Avenue E		N 2093.0; E 1991.0			Vertical	-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
10-3-90	10-3-90	Hydro Group, Inc.	Tripod	6"	6.0	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
5.1/85*		0	3	NA	35.0	↓ / none ATD ↓ / NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		R. L. Sayre <i>[Signature]</i>		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.4	2 4 6				35.0			0.0 - 0.8 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, with rounded quartz pebbles up to 1.5" near the top.	Complete borehole number is B3890R308.
SS	2.0	1.7	7 8 10 10				33.0			0.8 - 2.9 ft: SAND, (SW); Yellowish gray (5Y7/2), mottled with Light olive gray (5Y5/2) between 1.0 - 1.7'; humic layer, Dark gray (N3), between 0.8 - 1.0'; fine grained, silty, laminated; siltstone pebble, Dark reddish brown (10R3/4), at base.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	2.0	20 20 27 28				31.3 31.0 30.3	5		2.9 - 4.7 ft: SAND, (SW); Yellowish gray (5Y7/2) mottled with Medium gray (N5); medium grained, silty; interbedded with seams of Silty Clay, gray, and Silty Sand, orange-brown, between 2.9 - 3.3'; red siltstone fragments near 3.3'; sandy inclusions (?), Dark reddish brown (10R3/4), between 4.2 - 4.4'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							29.0			4.7 - 6.0 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), medium to coarse grain, with a few quartz pebbles; very coarse, clean, sand composed of quartz and lithic particles between 5.7 - 5.9'.	Hole enlarged by driving 6" steel casing, removing it at intervals to knock out the slough, then re-driving the casing until reaching total depth.
										TOTAL DEPTH = 6.0 FT.	Steel casing removed and 3" PVC casing inserted for gamma-logging.
											PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	108 Avenue E	Last Update: 03-20-92	HOLE NO. R308
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R309
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
108 Avenue E			N 2100.0; E 2075.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-3-90	10-3-90	Hydro Group, Inc.	Tripod		6"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.1/85*		0	3	NA	35.0	7 / none ATD NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			R. L. Sayre <i>[Signature]</i>					

SAMP TYPE	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	LOSS IN G.P.M	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.						
SS	2.0	1.9	6				35.0				0.0 - 2.5 ft: Silty SAND, (SM); Pale brown (5YR5/2) changing to Dark reddish brown (10R3/4) at 0.5', with gravel, 2.5" diameter siltstone fragment at 1.8', silt layer and coarse sand layer between 2.0 - 2.5'.	Complete borehole number is B3890R309.
SS	2.0	1.5	5 7 10 5				33.1 33.0 32.5 32.0 31.5 31.0				2.5 - 3.0 ft: Clayey SILT, (ML); Dark gray (NS).	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.7	18 28 22 24				29.3 29.0	5			3.0 - 3.5 ft: Silty SAND, (SM); Pale yellowish brown (10YR6/2), gravelly. 4.0 - 5.7 ft: SILT, (ML); Moderate yellowish brown (10YR5/4), with dark brown specks and faint purplish tinge between 5.2 - 5.7'; fine to coarse sand with small pebbles disseminated between 4.0 - 5.2', and with very fine sand below; stiff to very stiff.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
TOTAL DEPTH = 6.0 FT.												Hole enlarged by driving 6" steel casing, removing it at intervals to knock out the slough, then redriving the casing until reaching total depth.
												Steel casing removed and 3" PVC casing inserted for gamma-logging.
												PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.
												* Core recovery refers to total soil & rock sample.
												Ground elevation estimated from site topographic map.
												Description & classification by visual examination of sample.
												Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	108 Avenue E	Last Update: 03-20-92	HOLE NO. R309
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GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R310
SITE 108 Avenue E		COORDINATES N 2078.0; E 2076.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 10-3-90	COMPLETED 10-4-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 6"	OVERBURDEN 6.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 5.3/88*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: R. L. Sayre		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
SS	2.0	1.6	3				35.0			0.0 - 1.5 ft: Silty, Gravelly SAND, (SW); Moderate brown (5YR5/4), layer of topsoil, Medium gray (N5), with abundant roots, between 0.0 - 0.5'; reddish siltstone pebbles up to 2" diameter.	Complete borehole number is B3890R310.
SS	2.0	2.0	7				33.5 33.4 33.0			1.5 - 2.9 ft: Silty SAND, (SM); mottled gray and olive, stiff; gravelly, dark red between 2.6 - 2.9'.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.7	21 25 26 27				31.3			2.9 - 3.7 ft: Silty SAND, (SM); Dark gray (N3) changing to medium yellowish gray (5Y6/2) at 3.2'; sand is fine grained, organic between 2.9 - 3.2'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							29.3 29.0	5		3.7 - 5.7 ft: Silty SAND to Sandy SILT, (SM-ML); Moderate yellowish brown (10YR5/4), sand is very fine to fine grained; thin (1/8") lamina of cemented red sand at 5.2'; loessic at 5.4'; very stiff, moist below 5.0'.	Hole enlarged by driving 6" steel casing, removing it at intervals to knock out the slough, then redriving the casing until reaching total depth.
TOTAL DEPTH = 6.0 FT.											Steel casing removed and 3" PVC casing inserted for gamma-logging.
											PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 108 Avenue E	Last Update: 03-20-92	HOLE NO. R310
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R311

SITE

108 Avenue E

COORDINATES

N 2064.0; E 2068.5

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-4-90

COMPLETED

10-4-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

6"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

3.4/57*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

none ATD / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

R. L. Sayre

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.7	2 2 3						35.0				0.0 - 2.3 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), with reddish siltstone and sandstone pebbles, gravel at base.	Complete borehole number is B3890R311.
SS	2.0	0.5	5 10 12 12						33.3 33.0 32.7 32.5				2.3 - 2.5 ft: Organic SILT, (OL).	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.2	30 25 30 25						31.0 30.1 29.8 29.0				4.0 - 4.9 ft: Silty SAND, (SM); orange-brown [10YR5/6], sand is coarse grained, very dense, with hard sandstone pebbles; 2 x 3" sandstone (or basaltic) cobble, grayish-brown, fine grained, hard, cemented, weathered, between 4.8 - 5.0'. 4.9 - 5.2 ft: Sandy SILT to Silty SAND, (ML-SM); Moderate yellowish brown (10YR5/4), sand is very fine grained.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Rock jammed in split spoon in top of run; assume recovery is toward bottom of run. Hole enlarged by driving 6" steel casing, removing it at intervals to knock out the slough, then re-driving the casing until reaching total depth.
TOTAL DEPTH = 6.0 FT.													Steel casing removed and 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE

108 Avenue E

Last Update: 03-20-92

HOLE NO. R311



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

SHEET NO.

HOLE NO.

14501-138

1 OF 1

R312

SITE

108 Avenue E

COORDINATES

N 2062.0; E 2076.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

COMPLETED

DRILLER

DRILL MAKE AND MODEL

SIZE

OVERBURDEN

ROCK (FT.)

TOTAL DEPTH

10-4-90

10-4-90

Hydro Group, Inc.

Tripod

6"

6.0

0.0

6.0

CORE RECOVERY (FT./%)

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

4.9/82*

0

3

NA

35.0

7 / -5' ATD

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

R. L. Sayre

(Template: MYWD)

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.7	2	33					35.0					
			3	33					34.4				0.0 - 0.6 ft: Silty SAND, (SM); Grayish brown (5YR5/2), with organic matter.	<p>Complete borehole number is B3890R312.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Hole enlarged by driving 6" steel casing, removing it at intervals to knock out the slough, then re-driving the casing until reaching total depth.</p> <p>Steel casing removed and 3" PVC casing inserted for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.</p>
			4	33					33.6				0.6 - 1.4 ft: GRAVEL, (GW); medium brown (5YR5/4), silty, sandy.	
SS	2.0	2.0	8	99					33.3				1.4 - 1.7 ft: Sandy SILT to Silty SAND, (OL); Dark gray (NS), organic.	
			10	15					33.0				2.0 - 3.8 ft: Sandy SILT, (ML); Dark gray (NS), sand is fine grained, with roots, lamina to very thin beds of Clay between 2.0 - 2.3'.	
SS	2.0	1.2	nr						31.2				3.8 - 5.2 ft: SAND, (SW); orange-brown (10YR5/6) with some grayish mottling, very fine to fine grained, with some clayey patches.	
									29.8	5				
									29.0					
												TOTAL DEPTH = 6.0 FT.		

nr = not recorded.
 * Core recovery refers to total soil & rock sample.
 Ground elevation estimated from site topographic map.
 Description & classification by visual examination of sample.
 Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
 HX = HAND AUGER; O = OTHER

SITE

108 Avenue E

Last Update: 03-20-92

HOLE NO.

R312



GEOLOGIC DRILL LOG			PROJECT FUSRAP		JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R313	
SITE 108 Avenue E			COORDINATES N 2058.0; E 2085.0		ANGLE FROM HORIZ Vertical		BEARING -----	
BEGUN 10-4-90	COMPLETED 10-4-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 6"	OVERBURDEN 7.0	ROCK (FT.) 0.0	TOTAL DEPTH 7.0
CORE RECOVERY (FT./%) 5.3/76*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER ↓ / -4.5' ATD	DEPTH/EL. TOP OF ROCK NA/NA	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: R. L. Sayre			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLKS. % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.6	3 3				35.0			(Template: MYWD)	
							34.5			0.0 - 0.5 ft: Sandy SILT, (ML); Gray, with gravel up to 1.6" diameter.	Complete borehole number is B3890R313.
							33.6			0.5 - 1.4 ft: SAND, (SW); grades to yellow brown with depth, fine grained.	
SS	2.0	1.7	4 17 35 30				33.3 33.0 32.5			1.4 - 2.5 ft: Sandy SILT to Silty SAND, (OL - SM); Dark gray (NS), Silt changing to Sand at 1.4'.	Hole advanced to depth by 3" OD split spoon samplers.
							31.3			2.5 - 4.2 ft: SAND, (SW); Grayish orange pink (5YR7/2) changing to Light brown (5YR5/6) at 3.1', medium grained with scattered small pebbles; laminae of gray Clay between 3.1 - 3.2'; dense.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	17 20 25 30				31.0 30.8			4.2 - 6.0 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), medium grained, with layers of silt and coarse sand.	Hole caved-in to -5'; last split spoon driven to 7.0'.
SS	1.0	0.0	17 21				29.0				
							28.0			TOTAL DEPTH = 7.0 FT.	Hole enlarged by driving 6" steel casing, removing it at intervals to knock out the slough, then re-driving the casing until reaching total depth.
											Steel casing removed and 3" PVC casing inserted for gamma-logging.
											PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.
											* Core recovery refers to total soil & rock sample.
											Ground elevation estimated from site topographic map.
											Description & classification by visual examination of sample.
											Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 108 Avenue E	Last Update: 03-20-92	HOLE NO. R313
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R434
SITE Avenue E (near 108)			COORDINATES N 2074.0; E 2092.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 1-10-91	COMPLETED 1-10-91	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Soil Sentry	SIZE 8"	OVERBURDEN 6.0	ROCK (FT.) 0.0	TOTAL DEPTH 6.0
CORE RECOVERY (FT./%) 3.4/57*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.5	0.9	18					35.0				0.0 - 1.2 ft: ASPHALT; over Fill, Sandy Gravel, Grayish black (N2).	Complete borehole number is B3890R434.
SS	2.0	1.3	9					34.8				1.2 - 2.1 ft: Sandy, Clayey SILT, (ML); Grayish black (N2), slightly plastic, firm, moist.	Augered through asphalt to 0.5'.
SS	2.0	1.2	12					33.8				2.1 - 5.2 ft: Clayey SAND to Silty SAND, (SC-SM); Moderate yellowish brown (10YR5/4) mottled with Greenish gray (5GY6/1) and Light olive brown (5Y5/6); sand is very fine to fine grained, slightly coarser with depth; moderately to moderately well sorted, clayey layers are slightly plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
								33.6					
								33.0					
								32.9					
								31.7					
								31.0					
								29.8	5				
								29.0					
TOTAL DEPTH = 6.0 FT.												Augered to total depth of 6.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Avenue E (near 108)	Last Update: 03-20-92	HOLE NO. R434
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R314
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
112 Avenue E			N 2,051.0; E 2,050.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-4-90	10-4-90	Hydro Group, Inc.	Tripod		6"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.1/85*		0	3	NA	35.0	V / none ATD NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in			none			R. L. Sayre				

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLMS. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.7	3 4 5			35.0 34.7				0.0 - 0.3 ft: TOPSOIL; Silty Sand, (SM); Grayish brown (5YR3/2). 0.3 - 1.7 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), fill.	Complete borehole number is B3890R314.
SS	2.0	1.6	5 7 10			33.3 33.0 32.5				2.0 - 2.5 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), well graded, with small pebbles.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.8	25 32 32 34			31.6 31.4 31.0 30.7 30.0				2.5 - 3.4 ft: Clayey SILT, (OL); Dark gray (N3), buried soil. 3.4 - 4.3 ft: Silty CLAY and SAND, (SC); Dark gray (N3) mottled with Light gray (N7); Silty Clay grading to Sand between 3.4 - 3.6'; coarse sand with laminae of clay between 4.0 - 4.3'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
						29.2 29.0				4.3 - 5.0 ft: SAND, (SW); Dark yellowish orange (10YR6/6) to Moderate yellowish brown (10YR5/4), slightly mottled; fine grained with some coarse sand disseminated. 5.0 - 5.8 ft: SAND, (SP); Dark yellowish brown (10YR4/2), fine to medium grained, massive, dense.	Borehole enlarged by driving 6" steel casing to depth. Steel casing removed and 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
										TOTAL DEPTH = 6.0 FT.	

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	112 Avenue E	Last Update: 09-22-92	HOLE NO. R314
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GEOLOGIC DRILL LOG

PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R315	
SITE	112 Avenue E		COORDINATES		N 2049.0; E 2074.0		ANGLE FROM HORIZ	BEARING
BEGUN	10-5-90	COMPLETED	10-5-90	DRILLER	Hydro Group, Inc.		DRILL MAKE AND MODEL	SIZE
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
5.2/65*		0		4		NA	35.0	6" / -6' ATD
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:		
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.T.	TIME MIN.					
SS	2.0	1.1	5 12 15 20				35.0			(Template: MYWD)	
SS	2.0	0.7	7 15 20 21				33.9			0.0 - 2.1 ft: Silty SAND (SM); Moderate reddish brown (10R4/6), with gravel up to 0.1', abundant fine roots, slightly moist, loose.	Complete borehole number is B3890R315.
SS	2.0	1.8	29 30 29 30				33.0 32.9 32.3			2.1 - 2.7 ft: SAND, (SW); Pale brown (5YR5/2), minor silt and pebbles <5mm, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.6	nr				31.0			4.0 - 7.6 ft: SAND, (SP); Dark yellowish brown (10YR4/2), fine to medium grained, moderately well sorted; 1 cm sedimentary clast composed of Clay, Light gray (N7), between 5.0 - 5.1'; firm, moist to wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							29.2 29.0				
							27.4 27.0				
TOTAL DEPTH = 8.0 FT.										Borehole enlarged by driving 6" steel casing to depth.	
										Steel casing removed and 3" PVC casing inserted for gamma-logging.	
										PVC casing was removed after logging and hole was backfilled with drilling spoils.	
										nr = not recorded.	
										* Core recovery refers to total soil & rock sample.	
										Ground elevation estimated from site topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

112 Avenue E

Last Update: 03-20-92

HOLE NO. R315



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: R316

SITE: 112 Avenue E
 COORDINATES: N 2,075.0; E 2,029.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 10-5-90
 COMPLETED: 10-5-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Tripod
 SIZE: 3.5"
 OVERBURDEN: 6.0
 ROCK (FT.): 0.0
 TOTAL DEPTH: 6.0

CORE RECOVERY (FT./%): 5.8/97*
 CORE BOXES: 0
 SAMPLES: 3
 SEL. TOP CASING: NA
 GROUND EL.: 35.0
 DEPTH/EL. GROUND WATER: -6' ATD / NA
 DEPTH/EL. TOP OF ROCK: NA/NA

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Lewis R. West

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.8	3 4 5				35.0				0.0 - 1.8 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), fine to medium grained.	Complete borehole number is B3890R316. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	5 6 7 9				33.2 33.0				2.0 - 5.6 ft: Silty SAND, (SM); Moderate brown (5YR3/4) changing to (5YR4/4) at 3.8', mottled with Light olive gray (5Y5/2) between 4.8 - 5.6'; fine to medium grained.	
SS	2.0	2.0	20 22 24 18				29.4 29.0	5			5.6 - 6.0 ft: SAND, (SP); Moderate brown (5YR4/4), medium grained, moist.	
TOTAL DEPTH = 6.0 FT.											Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.	
<p>Borehole coordinates changed from original field log based on later visual inspection and/or CAD Drawings.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>												

SS = SPLIT SPOON; NO = CORE BARREL;
 HX = HAND AUGER; 0 = OTHER

SITE: 112 Avenue E
 Last Update: 09-23-92
 HOLE NO.: R316



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

SHEET NO.

HOLE NO.

14501-138

1 OF 1

R317

SITE

112 Avenue E

COORDINATES

N 2099.0; E 2071.0

ANGLE FROM HORIZ. BEARING

Vertical

BEGUN

10-5-90

COMPLETED

10-5-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.5

ROCK (FT.)

0.0

TOTAL DEPTH

6.5

CORE RECOVERY (FT./%)

5.6/86*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

0

4

NA

35.0

NA

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Lewis R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	% CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
SS	1.5	1.5	3	4				35.0				(Template: MYWD)	
			5									0.0 - 1.5 ft: Silty SAND, (SM); Grayish brown (5YR3/2), fine grained.	Complete borehole number is B3890R317.
SS	2.0	1.2	30	16				33.5				1.5 - 5.8 ft: Silty SAND, (SM); Dusky red (5R2/2), mottled with Light olive gray (5Y5/2) between 4.2 - 5.8'; fine to medium grained; layer of Sand, Dusky yellow (5Y6/4), medium grained, between 3.7 - 4.2'.	Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
			10					32.3					
SS	1.5	1.4	12	17				31.5					
			17					31.3					
			17					30.8					
SS	1.5	1.5	17	17				30.1	5				
			17					30.0					
			24					29.2					
								28.5					
												5.8 - 6.5 ft: SAND, (SW); Moderate brown (5YR4/4), medium grained, wet.	Borehole enlarged by driving 3.5" OD split spoon to depth.
												TOTAL DEPTH = 6.5 FT.	3" PVC casing inserted for gamma-logging.
													PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

112 Avenue E

Last Update: 03-20-92

HOLE NO. R317



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
112 Avenue E			FUSRAP	14501-138	1 OF 1	R318
SITE		COORDINATES			ANGLE FROM HORIZ	BEARING
10-5-90		10-5-90		N 2099.0; E 2085.0		Vertical
BEGUN		COMPLETED		DRILL MAKE AND MODEL	SIZE	OVERBURDEN
10-5-90		10-5-90		Hydro Group, Inc.	Tripod	3.5"
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
6.7/96*		0	4	NA	35.0	-6' ATD
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Lewis R. West		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	1.5	1.2	2	4				35.0				(Template: MYWD) 0.0 - 2.2 ft: Silty SAND, (SM); Grayish brown (5RY3/2), Grayish red (5R4/2) between 1.5 - 2.0; fine to medium grained, medium grained between 1.5 - 2.0'; angular sandstone pebble (2" x 2.5") at 1.5'. 2.2 - 4.1 ft: Silty SAND, (SM); Dusky brown (5YR2/2), fine grained. 4.1 - 6.0 ft: Silty SAND, (SM); Dusky yellow (5Y6/4) mottled with Light olive gray (5Y6/2), medium grained. 6.0 - 7.0 ft: Silty SAND, (SM); Moderate brown (5YR4/4), medium grained, wet. TOTAL DEPTH = 7.0 FT.	Complete borehole number is B3890R318. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
			16				33.8						
SS	2.0	2.0	9	5			33.5						
			8	15			32.8						
SS	1.5	1.5	20	21			30.9						
SS	2.0	2.0	14	15			29.0		5				
			17	20			28.0						

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	112 Avenue E	Last Update: 03-20-92	HOLE NO. R318
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP		14501-138	1 OF 1	R319		
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
112 Avenue E			N 2050.0; E 2000.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-9-90	10-9-90	Hydro Group, Inc.	Tripod		3.5"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.1/68*		0	3	NA	35.0	none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Lewis R. West					
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLK. CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.						TIME MIN.
SS	2.0	1.1	4 5 12 20			35.0			0.0 - 2.5 ft: Silty CLAY, (CL); Moderate brown (5YR3/4), fine grained, pebbles throughout.	Complete borehole number is B3890R319.
SS	2.0	1.4	12 15 22 30			33.9 33.0 32.5			2.5 - 5.6 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6) mottled with Grayish pink (5R8/2), fine grained between 2.5 - 5.0', fine to medium grained below.	Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	46 47 46 46			31.0 29.4 29.0	5		TOTAL DEPTH = 6.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER									* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SITE				112 Avenue E				Last Update:	HOLE NO.	
								03-20-92	R319	



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R320

SITE

112 Avenue E

COORDINATES

N 2036.0; E 1993.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

10-9-90

COMPLETED

10-9-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

4.5/75*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

none ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Lewis R. West

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.3	4	4				35.0					
			4	4				34.3				0.0 - 0.7 ft: TOPSOIL, (SM); Blackish red (5R2/2), fine grained.	Complete borehole number is B3890R320.
			3	3				34.1				0.7 - 0.9 ft: Silty CLAY, (CL); Blackish red (5R2/2), plastic.	
			10	10				33.7				0.9 - 3.6 ft: Clayey SILT, (ML); Pale reddish brown (10R5/4) gradationally changing with depth to Moderate reddish brown (10R3/4), fine grained.	
SS	2.0	1.6	12	25				33.0					Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
			23	23				31.4					
			24	24				31.0					
SS	2.0	1.6	10	20				29.4	5			4.0 - 5.6 ft: Silty SAND, (SM); Light brown (5YR6/4) mottled with Light olive gray (5Y5/2), fine to medium grained.	
			24	24				29.0					
TOTAL DEPTH = 6.0 FT.												Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.	
* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).													

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

112 Avenue E

Last Update: 03-20-92

HOLE NO. R320



GEOLOGIC DRILL LOG			PROJECT FUSRAP		JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R321	
SITE 112 Avenue E			COORDINATES N 2020.0; E 1986.0		ANGLE FROM HORIZ Vertical		BEARING -----	
BEGUN 10-9-90	COMPLETED 10-9-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0	TOTAL DEPTH 6.0
CORE RECOVERY (FT./%) 4.8/80*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER -5' ATD / NA		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Lewis R. West				

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.6	3 6				35.0			(Template: MYWD)	
							34.1			0.0 - 0.9 ft: Silty SAND, (SM); Blackish red (5R2/2), fine grained.	Complete borehole number is B3890R321. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	8 10 12				33.4 33.0			0.9 - 1.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4), fine grained.	
							31.6			2.0 - 3.4 ft: Silty SAND, (SM); Moderate brown (5YR4/4) mottled with Grayish orange (10YR7/4), fine to medium grained.	
SS	2.0	1.8	16 22 25 30				31.0			4.0 - 5.8 ft: Silty SAND, (SM); Moderate brown (5YR4/4), medium grained, wet.	
							29.2 29.0			TOTAL DEPTH = 6.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 112 Avenue E	Last Update: 03-20-92	HOLE NO. R321
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GEOLOGIC DRILL LOG

PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R322	
SITE	112 Avenue E		COORDINATES		N 1,986.0; E 2,007.0		ANGLE FROM HORIZ	BEARING
BEGUN	10-9-90	COMPLETED	10-9-90	DRILLER	Hydro Group, Inc.		DRILL MAKE AND MODEL	SIZE
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	ROCK (FT.)	TOTAL DEPTH
5.6/93*		0	3	NA	35.0	↓ / none ATD ↓ / NA	0.0	6.0
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:			
140 lbs/30 in		none			Lewis R. West			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. CORE RECOVERY	LOSS ON DRY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE
					G.P.M.	PRESS. P.S.I.	TIME MIN.				
SS	2.0	1.8	2 4 8					35.0			
SS	2.0	2.0	5 10 12 15					34.5 33.8 33.2 33.0 32.6			
SS	2.0	1.8	18 25 28 32					29.4 29.2 29.0			

(Template: MYMD)

DESCRIPTION AND CLASSIFICATION

0.0 - 0.5 ft: Silty CLAY, (CL); Blackish red (5R2/2), fine grained.

0.5 - 1.2 ft: Silty SAND, (SM); Dusky red (5R3/4), fine grained.

1.2 - 1.8 ft: Silty SAND, (SM); Grayish red (5R4/2), fine to medium grained.

2.0 - 2.4 ft: Silty SAND, (SM); Blackish red (5R2/2), fine grained.

2.4 - 5.6 ft: Silty SAND, (SM); Light brown (5YR6/4) mottled with Light olive gray (5Y5/2), fine to medium grained.

5.6 - 5.8 ft: Silty CLAY, (CL); Light brown (5YR6/4) mottled with Light olive gray (5Y5/2), slightly plastic.

TOTAL DEPTH = 6.0 FT.

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

Complete borehole number is B3890R322.

Hole advanced to depth by 3" OD split spoon samplers.

Borehole sampled and gamma-logged by TMA/Eberline Corp.

Borehole enlarged by driving 3.5" OD split spoon to depth.

3" PVC casing inserted for gamma-logging.

PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	112 Avenue E	Last Update:	09-22-92	HOLE NO.	R322
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
112 Avenue E				FUSRAP		14501-138	1 OF 1	R323	
SITE		COORDINATES				ANGLE FROM HORIZ		BEARING	
112 Avenue E		N 2051.0; E 2015.0				Vertical		-----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	
10-10-90	10-10-90	Hydro Group, Inc.		Tripod		3.5"	6.0	0.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
4.9/82*		0	3	NA	35.0	/ none ATD		NA/NA	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in		none			Lewis R. West				
SAMP. TYPE	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	
SS	2.0	1.4	3 7 12 18				35.0		
SS	2.0	1.7	8 11 13 12				33.6 33.0 32.7		
SS	2.0	1.8	24 23 23 20				31.3 31.0 30.9 30.0	5	
							29.2 29.0		
<p>(Template: NYWD)</p> <p>DESCRIPTION AND CLASSIFICATION</p> <p>0.0 - 2.3 ft: Silty SAND, (SM); Grayish red (5R4/2), fine grained, few pebbles at 1.0'.</p> <p>2.3 - 3.7 ft: Silty SAND, (SM); Blackish red (5R2/2) changing to Moderate brown (5YR4/4) at 2.7', fine grained.</p> <p>4.0 - 4.1 ft: Silty CLAY, (CL); Moderate brown (5YR4/4) mottled with Moderate olive brown (5Y4/4), plastic.</p> <p>4.1 - 5.0 ft: Silty SAND, (SM); Moderate olive brown (5YR4/4) mottled with Moderate olive brown (5Y4/4), fine to medium grained.</p> <p>5.0 - 5.8 ft: Silty CLAY, (CL); Grayish olive (10Y4/2), plastic; changing to Moderate red (5R5/4), slightly plastic at 5.2'.</p> <p>TOTAL DEPTH = 6.0 FT.</p>									
<p>NOTES ON: WATER LEVEL, WATER RETURN, CHARACTER OF DRILLING, ETC.</p> <p>Complete borehole number is B3890R323.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.</p>									
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>									
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			112 Avenue E		Last Update: 03-20-92	HOLE NO. R323



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R324
SITE 112 Avenue E		COORDINATES N 2,015.0; E 2,035.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 10-10-90	COMPLETED 10-10-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 4.8/80*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Lewis R. West		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLONDS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.2	3 12 21 32				35.0		0.0 - 1.0 ft: Silty CLAY, (CL); Blackish red (5R2/2), fine grained.	Complete borehole number is B3890R324. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.6	21 22 23 30				34.0 33.8 33.0		1.0 - 3.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4) with traces of Grayish orange (10YR7/4), fine grained.		
SS	2.0	2.0	21 30 30 32				31.4 31.0	5	4.0 - 6.0 ft: Silty SAND, (SM); Moderate brown (5YR4/4) mottled with Light olive gray (5Y5/2), fine to medium grained.		
TOTAL DEPTH = 6.0 FT.										Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
 HX = HAND AUGER; O = OTHER

112 Avenue E

Last Update: 09-22-92 HOLE NO. R324



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R325**

SITE: **112 Avenue E** COORDINATES: **N 2,016.0; E 2,018.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-10-90** COMPLETED: **10-10-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Tripod** SIZE: **3.5"** OVERBURDEN: **6.0** ROCK (FT.): **0.0** TOTAL DEPTH: **6.0**

CORE RECOVERY (FT./%): **4.7/78*** CORE BOXES: **0** SAMPLES: **3** EL. TOP CASING: **NA** GROUND EL.: **35.0** DEPTH/EL. GROUND WATER: **▼ / -3' ATD** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Lewis R. West**

(Template: MYWD)

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.2	3	44				35.0				0.0 - 0.8 ft: Silty CLAY, (CL); Blackish red (5R2/2), fine grained.	Complete borehole number is B3890R325. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.
			7					34.2				0.8 - 2.1 ft: Silty SAND, (SM); Very dusky red (5R2/6) changing to Blackish red (5R2/2) at 2.0', fine grained.	
SS	2.0	1.5	2	33				33.0				2.1 - 6.0 ft: Silty SAND, (SM); Moderate brown (5YR4/4) mottled with Light olive gray (5Y5/2), fine to medium grained.	
			3					32.9					
			5					31.5					
SS	2.0	2.0	16	20				31.0					
			25					29.0					
TOTAL DEPTH = 6.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **112 Avenue E** Last Update: **09-22-92** HOLE NO.: **R325**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501-138	1 OF 1	R326				
112 Avenue E				N 2010.0; E 2016.0		ANGLE FROM HORIZ		BEARING				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-10-90	10-10-90	Hydro Group, Inc.	Tripod		3.5"	6.0	0.0	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
4.7/78*		0	3	NA	35.0	/ none ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Lewis R. West						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLONS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	5 0 0 0				35.0				(Template: MYWD) 0.0 - 3.5 ft: Silty SAND, (SM); Dusky red (5R3/4) changing to Light brown (5YR6/4) at 2.7' and to Blackish red (5R2/2) at 3.2, fine grained. 3.5 - 5.5 ft: Silty SAND, (SM); Moderate brown (5YR4/4) mottled with Light olive gray (5Y5/2), fine to medium grained. TOTAL DEPTH = 6.0 FT.	Complete borehole number is B3890R326. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.
SS	2.0	1.7	5 4 4 7			33.5 33.0						
SS	2.0	1.5	10 20 20 19			31.5 31.3 31.0	5					
						29.5 29.0						

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
112 Avenue E

Last Update: 03-20-92
HOLE NO. R326



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501-138** SHEET NO.: **1 OF 1** HOLE NO.: **R396**

SITE: **112 Avenue E** COORDINATES: **N 1995.0; E 2041.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **11-14-90** COMPLETED: **11-14-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Tripod** SIZE: **6"** OVERBURDEN: **12.0** ROCK (FT.): **0.0** TOTAL DEPTH: **12.0**

CORE RECOVERY (FT./%): **8.3/69*** CORE BOXES: **0** SAMPLES: **6** EL. TOP CASING: **NA** GROUND EL.: **35.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOCKS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.2	8 4 4 5				35.0					
							34.5				0.0 - 0.5 ft: TOPSOIL; Silty Sand, (SM); Moderate brown (5YR3/4), with roots, soft, moist.	Complete borehole number is B3890R396.
							33.8				0.5 - 2.6 ft: Silty SAND, (SM); Moderate brown (5YR3/4) gradationally changing to Grayish brown (5YR3/2), with clay and minor pebbles, moderately firm, moist.	
SS	2.0	2.0	8 15 15 15				33.0				2.6 - 4.9 ft: SAND, (SP); Grayish orange (10YR7/4), slightly mottled, changing to Moderate brown (5YR4/4) at 4.7'; sand is fine grained, medium grained with minor silt between 4.7 - 4.9'; moderately well sorted, slightly layered, firm, moist to wet.	Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							32.4				4.9 - 6.8 ft: Interlayered Silty CLAY and SAND, (CL & SP); clays are Pale yellowish brown (10YR6/2) to Dark yellowish brown (10YR4/2), plastic; sands are Light brown (5YR5/6) to Moderate brown (5YR4/4), fine grained, moderately well sorted; layers 0.5 - 1 cm thick, firm, moist.	
SS	2.0	1.5	7 18 20 22				30.1	5				
SS	2.0	0.8	7 16 25 28				29.0				8.0 - 8.8 ft: SAND, (SP); Moderate brown (5YR4/4), fine to medium grained, moderately well sorted, firm, moist.	Borehole enlarged by driving 6" steel casing to depth.
							28.2				8.8 - 9.2 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), sand is very fine grained, well sorted, firm, moist.	
SS	2.0	1.4	23 29 30 32				27.0					
							26.2				9.2 - 11.4 ft: SAND, (SP); Moderate brown (10YR4/4), fine grained, well sorted, firm, moist to wet.	3" PVC casing inserted to 11.0' for gamma-logging. Steel casing removed with PVC casing remaining in hole. PVC casing was removed after logging and hole was backfilled with drilling spoils.
							25.8					
SS	2.0	1.4	19 20 19 30				25.0	10				
							23.6					
							23.0					
TOTAL DEPTH = 12.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **112 Avenue E** Last Update: **03-20-92** HOLE NO.: **R396**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R416**

SITE: **112 Avenue E** COORDINATES: **N 2,058.0; E 2,006.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **11-21-90** COMPLETED: **11-21-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Soil Sentry** SIZE: **8"** OVERBURDEN: **10.0** ROCK (FT.): **0.0** TOTAL DEPTH: **10.0**

CORE RECOVERY (FT./%): **6.5/65*** CORE BOXES: **0** SAMPLES: **5** SEL. TOP CASING: **NA** GROUND EL.: **35.0** DEPTH/EL. GROUND WATER: **7 / -9' ATD** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	5 6 7 8				35.0 34.6				0.0 - 0.4 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), sand is fine grained, moderately sorted, with roots, loose, moist.	Complete borehole number is B3890R416. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 6.0'. Augered to 8.0'. Augered to total depth of 10.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. Borehole coordinates changed from original field log based on later visual inspection and/or CAD Drawings. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.3	5 6 6 9				33.0 32.0 31.7				0.4 - 3.0 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted, with sandstone gravel, firm, moist.	
SS	2.0	1.1	3 5 10 11				31.0 29.9	5			3.0 - 3.3 ft: Sandy, Clayey SILT, (ML); Grayish black (N2), slightly plastic, firm, moist.	
SS	2.0	1.5	36 31 30 28				29.0 27.5				4.0 - 7.5 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4) to Dark yellowish orange (10YR6/6), mottled between 7.0 - 7.5'; very fine sand interlayered with fine sand, interlayered with medium sands between 6.0 - 7.5', moderately well sorted within the layers, layers 0.1 - 0.4' thick, firm, moist to wet.	
SS	2.0	1.3	10 11 14 17				27.0 26.7 25.7				8.0 - 8.3 ft: SILT, (ML); Dark yellowish orange (10YR6/6) to Grayish orange (10YR7/4), minor very fine sand, moderately firm, moist.	
							25.0	10			8.3 - 9.3 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), interlayered very fine to fine sands, layers -5 cm thick, well sorted within the layers, moderately plastic, firm, moist to wet.	
TOTAL DEPTH = 10.0 FT.												



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R327

SITE

113 Avenue E

COORDINATES

N 2,119.0; E 2,009.0

ANGLE FROM HORIZ
Vertical

BEGUN

10-10-90

COMPLETED

10-10-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE
3.5"

OVERBURDEN
6.0

ROCK (FT.)
0.0

TOTAL DEPTH
6.0

CORE RECOVERY (FT./%)
5.3/88*

CORE BOXES
0

SAMPLES
3

EL. TOP CASING
NA

GROUND EL.
35.0

DEPTH/EL. GROUND WATER
-4' ATD

DEPTH/EL. TOP OF ROCK
NA/NA

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH
none

LOGGED BY:

Lewis R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	1	1				35.0				0.0 - 2.8 ft: Silty SAND, (SM); Blackish red (5R2/2), fine grained, with gravel.	Complete borehole number is B3890R327. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	2	2				33.5				2.8 - 3.8 ft: Silty SAND, (SM); Grayish red (10R4/2) mottled with Pale olive (10Y6/2).	
			3	3				32.2				4.0 - 4.4 ft: Silty CLAY, (CL); Blackish red (5R2/2), slightly plastic.	
SS	2.0	2.0	6	14				31.2 31.0 30.6				4.4 - 6.0 ft: CLAY, (CH); Grayish red (10R4/2) to olive gray (5Y3/2), plastic.	
			20					29.0				TOTAL DEPTH = 6.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

(Template: MYWD)

* Core recovery refers to total soil & rock sample.

 Ground elevation estimated from site topographic map.

 Description & classification by visual examination of sample.

 Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

113 Avenue E

Last Update:
09-22-92

HOLE NO.
R327



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R328

SITE

113 Avenue E

COORDINATES

N 2005.0; E 2140.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-10-90

COMPLETED

10-10-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

5.0/83*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

none ATD
NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Lewis R. West

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLKS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	3	10				35.0				(Template: MYWD) Complete borehole number is B3890R328. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
								33.6			0.0 - 3.0 ft: Silty SAND, (SM); Grayish brown (5YR3/2), fine grained, some sandstone gravel.		
SS	2.0	1.8	3	12				33.0			3.0 - 3.2 ft: Silty CLAY, (CH); Blackish red (5R2/2), plastic.		
								32.0			3.2 - 5.5 ft: Silty SAND, (SM); Grayish red (10R4/2) mottled with Olive gray (5Y3/2), fine grained.		
								31.8					
SS	2.0	1.8	21	22				30.8	5		5.5 - 6.8 ft: SAND, (SW); Dusky red (5R5/4) coarse grained, dirty, wet.		
								29.5					
								29.2					
								29.0			TOTAL DEPTH = 6.0 FT.		

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
 HX = HAND AUGER; O = OTHER

113 Avenue E

Last Update: 03-20-92

HOLE NO. R328



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R329
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
113 Avenue E			N 2050.0; E 2175.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-11-90	10-11-90	Hydro Group, Inc.	Tripod		3.5"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.5/75*		0	3	NA	35.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Lewis R. West						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	0.9	3 9				35.0				0.0 - 0.9 ft: Silty CLAY, (CL); Blackish red (5R2/2), fine grained.	Complete borehole number is B3890R329.
SS	2.0	1.6	6 9 12				33.0				2.0 - 3.6 ft: Silty SAND, (SM); Moderate brown (5YR3/4) changing to Blackish red (5R2/2) at 2.85' and to Light brown (5YR6/4) mottled with Moderate brown (5YR4/4) at 3.1', fine grained.	Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	10 22 28 30				31.4 31.0				4.0 - 6.0 ft: Silty SAND, (SM); Grayish red (10R4/2) mottled with Olive gray (5Y3/2), fine to medium grained.	
							29.0				TOTAL DEPTH = 6.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	113 Avenue E	Last Update: 03-20-92	HOLE NO. R329
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GEOLOGIC DRILL LOG			PROJECT FUSRAP		JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R330
SITE 113 Avenue E			COORDINATES N 2050.0; E 2200.0		ANGLE FROM HORIZ Vertical		
BEGUN 10-11-90	COMPLETED 10-11-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0	TOTAL DEPTH 6.0
CORE RECOVERY (FT./%) 5.1/85*	CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER NA / none ATD	DEPTH/EL. TOP OF ROCK NA/NA	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Lewis R. West			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONDS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION <small>(Template: MYWD)</small>	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS ON DRYING G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	3				35.0				<p>0.0 - 4.4 ft: Silty SAND, (SM); Blackish red (5R2/2) changing to Dusky red (5R3/4) at 0.9', to Grayish pink (5R8/2) at 2.0', and to Blackish red (5R2/2) at 4.0'; fine grained.</p> <p>4.4 - 6.0 ft: Silty SAND, (SM); Pale brown (5YR5/2) mottled with Light olive gray (5Y5/2), fine to medium grained.</p> <p>TOTAL DEPTH = 6.0 FT.</p>	<p>Complete borehole number is B3890R330.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.</p>
SS	2.0	1.6	6				33.5					
			14				33.0					
SS	2.0	2.0	12				31.4					
			17				31.0					
			25				30.6					
			28				29.0					

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 113 Avenue E	Last Update: 03-20-92	HOLE NO. R330
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GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
SITE					COORDINATES					ANGLE FROM HORIZ	BEARING			
113 Avenue E					N 2048.0; E 2221.0					Vertical	-----			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-11-90		10-11-90		Hydro Group, Inc.		Tripod		3.5"	6.0	0.0	6.0			
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.7/78*		0		3	NA	35.0	5' / -5' ATD NA / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			Lewis R. West <i>[Signature]</i>								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	LOSS IN G.P.M	WATER PRESS. TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
SS	2.0	1.3	2	3			35.0				(Template: MYWD)			
			4	6			34.5				0.0 - 0.5 ft: Silty CLAY, (CL); Blackish red (5R2/2), fine grained.	Complete borehole number is B3890R331.		
			8	12			33.7				0.5 - 1.3 ft: Silty SAND, (SM); Dusky red (5R2/2), fine grained, with small gravel.	Hole advanced to depth by 3" OD split spoon samplers.		
SS	2.0	1.6	4	8			33.0				2.0 - 4.9 ft: Silty SAND, (SM); Pale brown (5YR5/2) mottled with Light olive gray (5Y6/2), fine grained.	Borehole sampled and gamma-logged by TMA/Eberline Corp.		
			8	12			31.4							
			12	16			31.0							
SS	2.0	1.8	14	22			30.1	5			4.9 - 5.8 ft: Silty SAND, (SM); Moderate brown (5YR4/4), medium grained, wet.			
			22	24			29.2							
			24	25			29.0				TOTAL DEPTH = 6.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth.		
												3" PVC casing inserted for gamma-logging.		
												PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.		

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
113 Avenue E

Last Update:
03-20-92

HOLE NO.
R331



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501-138
 SHEET NO.: 1 OF 1
 HOLE NO.: R332

SITE: 113 Avenue E
 COORDINATES: N 2025.0; E 2224.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 10-11-90
 COMPLETED: 10-11-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Tripod
 SIZE: 3.5"
 OVERBURDEN: 6.0
 ROCK (FT.): 0.0
 TOTAL DEPTH: 6.0

CORE RECOVERY (FT./%): 4.9/82*
 CORE BOXES: 0
 SAMPLES: 3
 EL. TOP CASING: NA
 GROUND EL.: 35.0
 DEPTH/EL. GROUND WATER: none ATD / NA
 DEPTH/EL. TOP OF ROCK: NA/NA

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Lewis R. West

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.3	2 4 5				35.0				0.0 - 2.6 ft: Silty SAND, (SM); Dusky red (5R2/2) changing to Blackish red (5R2/2) at 2.0', fine grained.	Complete borehole number is B3890R332. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.8	3 4 14 14				33.7 33.0 32.4				2.6 - 3.8 ft: Silty SAND, (SM); Grayish pink (5R8/2), fine to medium grained.	
SS	2.0	1.8	9 10 22 24				31.2 31.0				4.0 - 5.6 ft: SAND, (SP); Grayish red (10R4/2), medium grained, wet.	
							29.4 29.2 29.0				5.6 - 5.8 ft: Silty SAND, (SM); Pale brown (5YR5/2), fine grained.	
TOTAL DEPTH = 6.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
 HX = HAND AUGER; O = OTHER

SITE: 113 Avenue E
 Last Update: 03-20-92
 HOLE NO.: R332



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R333

SITE

113 Avenue E

COORDINATES

N 2025.0; E 2200.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-11-90

COMPLETED

10-11-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

5.3/88*

CORE BOXES

SAMPLES

0

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

↓ / none ATD
↓ / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Lewis R. West

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.7	1				35.0					0.0 - 0.9 ft: Silty SAND, (SM); Blackish red (5R2/2), fine grained.	Complete borehole number is B3890R333. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			2				34.1					0.9 - 1.7 ft: Silty SAND, (SM); Grayish red (5R4/2), fine to medium grained.	
			4				33.3					2.0 - 2.2 ft: Silty SAND, (SM); Blackish red (5R2/2), fine grained.	
			8				33.0					2.2 - 3.7 ft: Silty SAND, (SM); Moderate brown (5YR4/4) mottled with Light olive gray (5Y5/2), fine to medium grained.	
			7				32.8					4.0 - 5.9 ft: Silty SAND, (SM); Grayish red (5R4/2) mottled with Dusky red (5R3/4), fine to medium grained.	
			10				31.3						
			15				31.0						
			19				29.1						
			19				29.0						
			18										
TOTAL DEPTH = 6.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

113 Avenue E

Last Update: 03-20-92

HOLE NO.

R333



GEOLOGIC DRILL LOG				PROJECT			JOB NO.		SHEET NO.		HOLE NO.	
113 Avenue E				N 2025.0; E 2150.0			14501-138		1 OF 1		R334	
SITE				COORDINATES			ANGLE FROM HORIZ		BEARING			
113 Avenue E				N 2025.0; E 2150.0			Vertical		-----			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
10-11-90		10-11-90		Hydro Group, Inc.		Tripod		3.5"	6.0	0.0	6.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING		GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.1/85*		0	3	NA		35.0	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Lewis R. West						
(Template: MYLD)												
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE RECOVERY	LOSS	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	1.4	2 2 1 3			35.0			0.0 - 1.4 ft: Silty CLAY, (CL); Blackish red (5R2/2) grading to Moderate brown (5YR5/4), fine grained, with angular sandstone gravel.		Complete borehole number is B3890R334.	
SS	2.0	1.7	1 1 3			33.6 33.0 32.0			2.0 - 3.0 ft: Silty SAND, (SM); Grayish red (5R4/2) changing to Blackish red (5R2/2) at 2.6', fine grained.		Hole advanced to depth by 3" OD split spoon samplers.	
SS	2.0	2.0	10 21 21 24			31.3 31.0 29.7 29.0	5		3.0 - 5.3 ft: Silty SAND, (SM); Dusky red (5R3/4) interlayered with Pale brown (5YR5/2), layers 0.2 - 0.3' thick, fine grained.		Borehole sampled and gamma-logged by TMA/Eberline Corp.	
									5.3 - 6.0 ft: Silty SAND, (SM); Moderate brown (5YR4/4) mottled with Light olive gray (5Y5/2), fine to medium grained.		Borehole enlarged by driving 3.5" OD split spoon to depth.	
										TOTAL DEPTH = 6.0 FT.		3" PVC casing inserted for gamma-logging.
												PVC casing was removed after logging; and hole was backfilled with grout and drilling spoils.
												* Core recovery refers to total soil & rock sample.
												Ground elevation estimated from site topographic map.
												Description & classification by visual examination of sample.
												Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		113 Avenue E				Last Update: 03-20-92		HOLE NO. R334



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R335
SITE 113 Avenue E		COORDINATES N 2050.0; E 2150.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 10-11-90	COMPLETED 10-11-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 5.2/87*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Lewis R. West		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	2				35.0				(Template: MYMD) 0.0 - 0.6 ft: Silty CLAY, (CL); Blackish red (5R2/2), fine grained. 0.6 - 3.0 ft: Silty SAND, (SM); Grayish red (5R4/2), fine to medium grained, with some sandstone pebbles. 3.0 - 3.3 ft: Silty CLAY, (CL); Blackish red (5R2/2), slightly plastic. 3.3 - 4.2 ft: Silty SAND, (SM); Moderate brown (5YR3/4). 4.2 - 6.0 ft: Silty SAND, (SM); Light olive gray (5Y5/2) mottled with Pale brown (5YR5/2), fine to medium grained. TOTAL DEPTH = 6.0 FT.	Complete borehole number is B3890R335. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.
			7				34.4					
			4				33.4					
			5				33.0					
SS	2.0	1.6	7				32.0					
			4				31.7					
			3				31.4					
			5				31.0					
SS	2.0	2.0	6				30.8					
			10				29.0					
			24									
			30									

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
 HX = HAND AUGER; O = OTHER

113 Avenue E

Last Update: **03-20-92** HOLE NO. **R335**



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R336
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
113 Avenue E			N 2045.0; E 2193.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-12-90	10-12-90	Hydro Group, Inc.	Tripod		3.5"	6.0	0.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.9/82*		0	3	NA	35.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Lewis R. West					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.6	2	3				35.0				0.0 - 0.9 ft: Silty CLAY (CL); Very dusky red (10R2/2), fine grained.	Complete borehole number is B3890R336.
			3	5				34.1				0.9 - 3.4 ft: Silty SAND, (SM); Moderate brown (5YR4/4), fine to medium grained; some gravel, 1.5 - 2.0", between 0.7 - 1.6'.	
SS	2.0	1.3	13	15				32.3				(2nd spoon = 2.7 - 4.0')	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			17	19				31.6					
SS	2.0	2.0	15	28				31.0				3.4 - 4.0 ft: Silty SAND, (SM); Grayish brown (5YR3/2) mottled with Light brown (5YR6/4), fine to medium grained.	Borehole enlarged by driving 3.5" OD split spoon to depth.
			32	18				30.7				4.0 - 4.3 ft: Silty SAND, (SM); Very dusky red (10R2/2), fine to medium grained, with small pebbles.	
								29.0				4.3 - 6.0 ft: Silty SAND, (SM); Grayish brown (5YR3/2) mottled with Light brown (5YR6/4), fine to medium grained.	PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 6.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	113 Avenue E	Last Update: 03-20-92	HOLE NO. R336
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

SHEET NO.

HOLE NO.

14501-138

1 OF 1

R338

SITE

113 Avenue E

COORDINATES

N 2099.0; E 2181.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-12-90

COMPLETED

10-12-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

5.3/88*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Lewis R. West

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.8	2	2				35.0				0.0 - 0.9 ft: Silty SAND, (SM); Blackish red (5R2/2), fine grained, few pebbles.	Complete borehole number is B3890R338.
			4	8				34.1				0.9 - 1.3 ft: Silty SAND, (SM); Grayish red (5R4/2), fine grained.	
SS	2.0	1.5	6	7				33.2				1.3 - 3.2 ft: Silty SAND, (SM); Dusky red (5R3/4) changing to Light olive gray (5Y5/2) at 2.7', fine to medium grained, few pebbles.	Hole advanced to depth by 3" OD split spoon samplers.
			6	5				33.0				3.2 - 3.5 ft: Silty SAND, (SM); Blackish red (5R2/2), fine grained.	
SS	2.0	2.0	24	34				31.8				4.0 - 6.0 ft: Silty SAND, (SM); Light olive gray (5Y5/2), mottled with Moderate brown (5YR4/4) below 4.7', fine grained, wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			35	40				31.5					
								31.0					
								29.0					
TOTAL DEPTH = 6.0 FT.												Borehole enlarged by driving 3.5" OD split spoon to depth.	
												3" PVC casing inserted for gamma-logging.	
												PVC casing was removed after logging and hole was backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

113 Avenue E

Last Update: 03-20-92

HOLE NO.

R338



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R339
SITE 113 Avenue E		COORDINATES N 2041.0; E 2193.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 10-12-90	COMPLETED 10-12-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 5.2/87*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER ↓ / none ATD
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Lewis R. West		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.7	2 3 7				35.0				0.0 - 3.0 ft: Silty SAND, (SM); Blackish red (5R2/2) changing to Grayish brown (5YR3/2) at 1.4', fine grained.	Complete borehole number is B3890R339.
SS	2.0	1.5	7 15 15 12				33.3 33.0				3.0 - 3.5 ft: Silty SAND, (SM); Pale yellowish brown (10YR6/2) with streaks of Moderate brown (5YR4/4), fine to medium grained.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	2.0	19 23 27 30				32.0 31.5 31.0				4.0 - 6.0 ft: Silty SAND, (SM); Dusky red (5R3/4) changing to Moderate brown (5YR4/4) with streaks of Light olive gray (5Y5/2) at 4.3', fine grained.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							29.0				TOTAL DEPTH = 6.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth.
												3" PVC casing inserted for gamma-logging.
												PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 113 Avenue E	Last Update: 03-20-92	HOLE NO. R339
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R340
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
113 Avenue E			N 2050.0; E 2117.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-15-90	10-15-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.7/71*		0	4	NA	35.0	V / none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Jon Novick						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.F.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.2	2					35.0				0.0 - 0.8 ft: TOPSOIL; Black (N1), silty, with roots.	Complete borehole number is B3890R340. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample.
			3					34.2				0.8 - 1.2 ft: Sandy SILT, (ML); reddish brown, minor clay.	
			5					33.8					
SS	2.0	0.5	3					33.0				2.0 - 2.5 ft: Silty CLAY, (CL); tan, limestone fragment at 2.5'.	
			5					32.5					
			18										
SS	2.0	2.0	21					31.0				4.0 - 4.6 ft: Sandy SILT, (ML); brownish olive gray, minor coarse grains, stringers of sand, gray, saturated.	
			23					30.4				4.6 - 6.0 ft: Sandy SILT, (ML); reddish brown, with minor clay, content increases with depth.	
			22					29.0				6.0 - 8.0 ft: Silty SAND, (SM); tan, grain size decreases with depth, saturated.	
			21										
SS	2.0	2.0	11					29.0					
			14										
			28										
			30										
								27.0				TOTAL DEPTH = 8.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	113 Avenue E	Last Update: 03-20-92	HOLE NO. R340
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.							
				FUSRAP		14501-138	1 OF 1	R341							
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING							
113 Avenue E			N 1996.0; E 2141.0			Vertical		-----							
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH							
10-15-90	10-15-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0							
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK							
6.1/76*		0	4	NA	35.0	V / none ATD / NA		NA/NA							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:										
140 lbs/30 in		none			Jon Novick										
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TESTS	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	2 2 6						35.0					0.0 - 0.7 ft: TOPSOIL; brown, silty, with roots.	Complete borehole number is B3890R341.
SS	2.0	0.7	6 5 7 11						34.3 33.6 33.0 32.3					0.7 - 2.7 ft: Sandy SILT, (ML); reddish brown with layers of gray up to 1" thick between 2.0 - 2.7', with rock fragments up to 2" in size between 0.7 - 1.4' and granitic cobbles up to -3" below.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	2.0	21 25 25 30						31.0 29.5	5				4.0 - 5.5 ft: Silty SAND, (SM); dark grey to blue gray, with some clay.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	14 16 21 23						27.0					5.5 - 8.0 ft: Sandy SILT, (ML); tan, loose, moist, wet below 6.0'.	
													TOTAL DEPTH = 8.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth.	
														3" PVC casing inserted for gamma-logging.	
														PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.	
														* Core recovery refers to total soil & rock sample.	
														Ground elevation estimated from site topographic map.	
														Description & classification by visual examination of sample.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				113 Avenue E		Last Update: 03-20-92		HOLE NO. R341			



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R342

SITE

113 Avenue E

COORDINATES

N 2050.0; E 2170.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-15-90

COMPLETED

10-15-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

6.0

ROCK (FT.)

0.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

5.2/87*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

↓ / none ATD
↓ / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Jon Novick

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.4	2 6 10				35.0			0.0 - 0.7 ft: TOPSOIL; brown, silty with minor sand, with roots.	Complete borehole number is B3890R342. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	2 6 8				34.3 33.6 33.0			0.7 - 2.8 ft: Sandy CLAY, (CL); reddish brown, with pebbles up to 1" in size.	
SS	2.0	2.0	8 6 15 19				32.2 31.2 31.0			2.8 - 6.0 ft: SAND, (SW); tan, mottled with orange between 4.0 - 6.0', with silt, organic rich layer at 2.8', loose, moist.	
							29.0	5		TOTAL DEPTH = 6.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

113 Avenue E

Last Update:
03-20-92

HOLE NO.
R342



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			COORDINATES	14501-138	1 OF 1	C364
113 Avenue E			N 2005.0; E 2140.5	ANGLE FROM HORIZ		BEARING
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
10-19-90	10-19-90	Hydro Group, Inc.	Tripod	3.5"	6.1	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
4.5/75*		0	3	NA	35.0	DEPTH/EL. TOP OF ROCK
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4		3				35.0				(Template: MYMD)	
				3				34.4				0.0 - 0.6 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), sand is fine grained, poorly sorted, minor pebbles, with roots, soft, moist.	Complete borehole number is B3890C364.
SS	2.0	1.1		3				33.0				0.6 - 1.4 ft: Silty SAND, (SM); Moderate brown (5YR3/4), sand is fine grained, moderately sorted, minor pebbles, soft, moist.	Hole advanced to depth by 3" OD split spoon samplers.
				15				31.9				2.0 - 3.1 ft: Gravelly, Silty SAND, (SM); Moderate brown (5YR3/4), sand is fine to medium grained, poorly sorted; gravel up to 0.1', subrounded to subangular; moderately firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.1	2.0		12				31.0				4.0 - 5.2 ft: SAND, (SW); Moderate brown (5YR3/4), fine to medium grained, poorly sorted, few pebbles up to 0.5 cm, firm, wet, gradational contact with layer below.	
				21				29.8	5			5.2 - 6.1 ft: Clayey SILT to Silty SAND, (ML-SP); Moderate yellowish brown (10YR5/4) to Pale yellowish brown (10YR6/2) to Grayish orange (10YR7/4), sand is very fine grained, moderately well sorted, clayey layers are slightly plastic, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
				22				28.0					3" PVC casing inserted for gamma-logging.
				35									PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
TOTAL DEPTH = 6.1 FT.													

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	113 Avenue E	Last Update: 03-20-92	HOLE NO. C364
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

SHEET NO.

HOLE NO.

14501-138 1 OF 1 R373

SITE

113 Avenue E

COORDINATES

N 1997.0; E 2160.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-24-90

COMPLETED

10-24-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

10.0

ROCK (FT.)

0.0

TOTAL DEPTH

10.0

CORE RECOVERY (FT./%)

8.4/84*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

NA

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
								35.0				(Template: NYWD)	
SS	2.0	1.0	3					34.5				0.0 - 0.5 ft: TOPSOIL; Silty Sand, (SM); Blackish red (5R2/2), with roots, soft, moist.	Complete borehole number is B3890R373.
			5					34.0				0.5 - 2.6 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), gravel is primarily sandstone, moderately firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.6	8					33.0				2.6 - 3.2 ft: SAND, (SW); Light olive gray (5Y5/2), fine to medium grained, moderately sorted, moderately firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			3					32.4				3.2 - 3.6 ft: Sandy to Clayey SILT, (ML); Dusky yellow green (5GY5/2) mottled with Grayish orange (10YR7/4); fine sandy layers common; small root channels present, firm, moist.	
SS	2.0	2.0	26					31.8				4.0 - 4.4 ft: Sandy SILT, (ML); Olive black (5Y2/1), minor pebbles, soft, moist.	
			27					31.4				4.4 - 5.3 ft: SILT, (ML); Light olive gray (5Y6/1) to Greenish gray (5GY6/1), with very fine grained sand and clay; thin irregular layers, 1 - 2 mm thick; very firm, slightly moist.	
			32					31.0				5.3 - 6.2 ft: Sandy SILT, (ML); Light brown (5YR5/6) to Moderate yellowish brown (10YR5/4), very fine sand, very firm, slightly moist.	
			42					30.6				6.2 - 9.7 ft: SAND, (SP); Moderate brown (5YR3/4 - 5YR4/4), fine to medium grained, moderately to moderately well sorted, minor fine layering present, firm, moist to wet.	Borehole enlarged by driving 3.5" OD split spoon to depth.
SS	2.0	2.0	10					29.7	5			9.7 - 9.8 ft: Clayey Sandy SILT, (ML); Pale olive (10Y6/2), soft, wet.	3" PVC casing inserted to 9.0' for gamma-logging.
			15					28.8				TOTAL DEPTH = 10.0 FT.	
			20					25.3					PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.
			20					25.2					
			21					25.0	10				

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE

113 Avenue E

Last Update: 03-20-92

HOLE NO.

R373



GEOLOGIC DRILL LOG				PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
113 Avenue E				N 1997.0; E 2205.0		14501-138		1 OF 1		R374	
SITE				COORDINATES				ANGLE FROM HORIZ		BEARING	
113 Avenue E				N 1997.0; E 2205.0				Vertical		-----	
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN	
10-24-90		10-24-90		Hydro Group, Inc.		Tripod		3.5"		10.0	
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER	
9.1/91*		0		5		NA		35.0		-7' ATD NA	
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:			
140 lbs/30 in				none				Stephen Knuttel			
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS / CORE RECOVERY	LOSS ON DRYN. G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.5	2 3 4				35.0			0.0 - 0.4 ft: TOPSOIL; Silty Sand, (SM); Brownish black (5YR2/1), with roots, soft, moist.	Complete borehole number is B3890C374. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 9.0' for gamma-logging. PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.6	2 3 4				34.6			0.4 - 2.6 ft: Gravelly, Sandy SILT, (ML); Dark reddish brown (10R3/4), gravel is primarily sandstone, soft, moist.	
SS	2.0	2.0	17 24 25 29				33.5			2.6 - 2.9 ft: Silty SAND, (SM); Brownish black (5YR2/1), sand is medium grained, moderately sorted, moderately firm, moist.	
SS	2.0	2.0	17 22 24 25				33.0			2.9 - 4.9 ft: SAND (SW); Moderate yellowish brown (10YR5/4), fine to medium grained, moderately sorted, firm, moist, gradational contact with layer below.	
SS	2.0	2.0	15 17 21 24				32.4	5		4.9 - 5.8 ft: SAND, (SP); Light brown (5YR5/6) to Moderate yellowish brown (10YR5/4), fine grained; some 1 cm thick medium grained layers between 5.6 - 5.8'; moderately well sorted, clean, firm, moist, sharp contact with layer below.	
							32.1			5.8 - 6.0 ft: SILT, (ML); Light brown (5YR5/6) to Moderate yellowish brown (10YR5/4), minor very fine grained sand, very firm, slightly moist.	
							31.4			6.0 - 8.0 ft: SAND, (SW); Light brown (5YR5/6), fine to medium grained, moderately sorted; minor clay and silt between 7.5 - 8.0'; firm; moderately firm, moist to wet.	
							31.0			8.0 - 10.0 ft: SAND, (SP); Dark reddish brown (10R3/4) changing to Dark yellowish brown (10YR4/2) at 8.3' and to Moderate brown (5YR4/4) at 9.4'; fine grained between 8.0 - 8.3', fine to medium grained between 8.3 - 9.4' and very fine grained below; moderately well sorted between 8.0 - 9.4', well sorted below; soft to firm, moist to wet.	
							29.2				
							29.0				
							27.0				
							25.0	10			
TOTAL DEPTH = 10.0 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
113 Avenue E

Last Update: 03-20-92
HOLE NO. R374



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R397
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
113 Avenue E			N 2010.0; E 2215.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-14-90	11-14-90	Hydro Group, Inc.	Tripod		3.5"	12.0	0.0	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
7.9/66*		0	6	NA	35.0	-8' ATD NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	3 6				35.0 34.7				0.0 - 0.3 ft: TOPSOIL; Silty Sand, (SM); Blackish red (5R2/2), with roots, soft, moist.	Complete borehole number is B3890R397. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 11.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.8	4 5 6				33.6 33.0 32.5 32.2				0.3 - 1.4 ft: Silty SAND, (SM); Moderate brown (5YR4/4), sand is fine to medium grained, moderately sorted, minor roots between 0.3 - 0.8' firm, moist.	
SS	2.0	1.5	6 18 10 20				31.2 31.0				2.0 - 2.5 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted; gravel is primarily sandstone, rounded; moderately firm, moist.	
SS	2.0	1.3	9 15 24 32				29.5 29.0 28.5	6			2.5 - 2.8 ft: Clayey SILT, (ML); Grayish black (N2); minor roots, slightly plastic, moderately firm, moist.	
SS	2.0	1.1	9 17 26 30				27.9 27.7 27.0				2.8 - 3.8 ft: Silty SAND, (SM); Dark yellowish orange (5Y5/2), sand is fine grained, moderately sorted, firm, moist.	
SS	2.0	0.8	17 15 10 11				25.9 25.0 24.2	10			4.0 - 6.5 ft: SAND, (SP); Moderate brown (5YR4/4) to Light brown (5YR5/6) changing to Moderate yellowish brown (10YR5/4) at 6.0', interlayered very fine, fine and medium grained sands, moderately well sorted within the layers, layers 0.1 - 0.2' thick, firm, moist to wet.	
							23.0				6.5 - 7.1 ft: Silty SAND, (SM); Light brown (5YR5/6), sand is fine grained, moderately sorted, minor clayey sedimentary clast, firm, moist.	
											7.1 - 10.8 ft: SAND, (SP); Moderate brown (5YR4/4), medium grained between 7.1 - 8.3', fine grained below, moderately well to well sorted, minor fine layering below 8.3', firm, moist to wet.	
											TOTAL DEPTH = 12.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	113 Avenue E	Last Update: 03-20-92	HOLE NO. R397
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	MOLE NO.
113 Avenue E			FUSRAP	14501-138	1 OF 1	R433
COORDINATES			N 2015.0; E 2141.0		ANGLE FROM HORIZ	BEARING
1-3-91			1-3-91	DRILLER	Vertical	-----
1-3-91			1-3-91	Hydro Group, Inc.	DRILL MAKE AND MODEL	TOTAL DEPTH
3.4/57°			0	3	Soil SENTRY	6.0
140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:	STEPHEN KNUTTLE
140 lbs/30 in			none		STEPHEN KNUTTLE	

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	0.7	5	5				35.0				0.0 - 0.2 ft: GRAVEL (GP); White (N9).	Complete borehole number is B3890R433. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 2.0'. Augered to 4.0'. Augered to total depth of 6.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			6	6				34.8				0.2 - 2.2 ft: Sandy GRAVEL (GW); Grayish brown (5YR3/3) with Dark reddish brown (10R3/4) sandstone fragments (Fill?).	
SS	2.0	1.4	3	4				33.0				2.2 - 2.4 ft: Clayey SILT (ML); Dark gray (N9), moderately plastic, soft, moist.	
			10	10				32.8				2.4 - 3.3 ft: Clayey SAND (SC); Moderate yellowish brown (10YR5/4) to Light brown (5YR6/4) with small spots of Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, moderately plastic, firm, moist.	
			30	30				31.7				3.3 - 5.3 ft: Silty SAND (SM); Light brown (5YR5/6), sand is fine grained, moderately sorted, firm, moist.	
SS	2.0	1.3	18	26				31.6				TOTAL DEPTH = 6.0 FT.	
			26	26				31.0					
			31	31				29.7	5				
								29.0					

SS = SPLIT SPOON; N9 = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	113 Avenue E	Last Update: 03-20-92	HOLE NO. R433
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.	
Avenue E (near 113)			FUSRAP	14501-138	1 OF 1	R435	
COORDINATES			N 2034.0; E 2104.0		ANGLE FROM HORIZ	BEARING	
Vertical						-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	
1-10-91	1-10-91	Hydro Group, Inc.	Soil Sentry	8"	8.0	0.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
5.0/63*		0	4	NA	35.0	7' ATD	NA/NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:			
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOMS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							35.0				(Template: MYWD)	
							34.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R435.
SS	1.5	0.9	14 15 10				33.8				0.5 - 1.4 ft: Silty SAND (SM); Moderate reddish brown (10R4/8), sand is fine grained, moderately sorted, minor sandstone gravel, firm, moist.	
SS	2.0	1.3	7 9 12 25				33.0				2.0 - 2.3 ft: Sandy, Clayey SILT (ML); Grayish black (N2), firm, moist.	Augered through asphalt to 0.5'.
							32.7				2.3 - 3.0 ft: Silty SAND (SM); Grayish green (10GY5/2) to Dusky yellow green (5GY5/2), sand is fine grained, moderately well sorted, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	20 7 27 30				31.0				3.0 - 3.3 ft: Clayey SAND (SC); Greenish gray (5GY6/1), sand is fine grained, moderately sorted, slightly plastic, firm, moist.	Augered to 2.0'.
							29.8	5			4.0 - 5.2 ft: Silty SAND (SM); Light olive gray (5Y5/2) mottled with Light olive brown (5Y5/6), sand is fine grained, moderately sorted, firm, moist.	Augered to 4.0'.
SS	2.0	1.4	8 18 18 8				28.7				5.2 - 6.3 ft: SILT (ML); Light brown (5YR5/6), minor sand, firm, moist.	Augered to 6.0'.
							27.6				6.3 - 7.4 ft: SAND (SP); Moderate brown (5YR4/4), fine grained, clean, moderately well sorted, moderately firm, moist to wet.	Augered to total depth of 8.0'.
							27.0				TOTAL DEPTH = 8.0 FT.	3" PVC casing inserted to total depth for gamma-logging.
												PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; SITE Avenue E (near 113) Last Update: 03-20-92 HOLE NO. R435
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R365

SITE

62 Trudy Drive

COORDINATES

N 1877.0; E 2500.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-22-90

COMPLETED

10-22-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

10.0

ROCK (FT.)

0.0

TOTAL DEPTH

10.0

CORE RECOVERY (FT./%)

6.7/67*

CORE BOXES

0

SAMPLES

5

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

NA / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS X CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.3	2				35.0					(Template: NYWD) Complete borehole number is B3890R365. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			8				34.7			0.0 - 0.3 ft: TOPSOIL; Silty Sand, (SM); Blackish red (5R2/2), with roots, moderately firm, moist.		
			16				33.7					
SS	2.0	1.5	15				33.0			0.3 - 6.4 ft: Gravelly, Silty SAND, (SM); Grayish red (5R4/2) changing to Dark reddish brown (10R5/4) at 2.0', sand is fine to medium grained, poorly sorted; increased silt content between 0.3 - 1.3'; gravel is primarily sandstone, subangular, content increases with depth; moderately firm to firm with depth, moist, sharp contact with layer below (Fill?).		
			14				31.5					
SS	2.0	0.6	10				31.0					
			17				30.4					
			16				29.0					
			15				28.6					
			20				28.3			6.4 - 6.7 ft: Silty CLAY, (CH); Grayish black (N2), high plasticity, soft, moist.		
SS	2.0	1.6	4				27.4			6.7 - 7.6 ft: Silty SAND, (SM); Grayish olive (10Y4/2), sand is fine to medium grained, moderately sorted, slightly layered, firm, moist; 1.5 cm thick layer of Clay, Pale green (10G6/2), plastic, between 7.2 - 7.3'.		
			8				27.0					
			15				25.3					
			21				25.0			8.0 - 9.7 ft: Interlayered SAND and Silty SAND, (SP & SM); Olive gray (5Y4/1) to Dark greenish gray (5GY4/1), sand is fine to medium grained, moderately well sorted within the layers, layers 0.2 - 0.3' thick, firm, moist to wet.		
			12									

TOTAL DEPTH = 10.0 FT.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

62 Trudy Drive

Last Update: 03-20-92

HOLE NO.

R365



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R366

SITE

62 Trudy Drive

COORDINATES

N 1880.0; E 2487.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-22-90

COMPLETED

10-22-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

8.0

ROCK (FT.)

0.0

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

5.1/64*

CORE BOXES

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

none ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRES. P.S.I.	TIME MIN.						
SS	2.0	1.0	2	2				35.0				(Template: MYWD)	
			2					34.0				<p>0.0 - 4.2 ft: Sandy SILT and Silty SAND (ML & SM); Grayish red (6R4/2 to 10R4/2); Blackish red (5R2/2) between 2.5 - 2.8'; sand is fine to medium grained, poorly sorted; increased silt content between 0.0 - 1.0' and 4.0 - 4.2'; with gravel, primarily sandstone, subangular, content decreases with depth; wood fragments between 0.0 - 1.0'; soft to moderately firm, moist, sharp contact with layer below (Fill?).</p> <p>4.2 - 5.6 ft: Clayey SILT, (ML); Brownish black (5YR2/1), fine roots, minor sand, low plasticity, soft, moist.</p> <p>5.6 - 6.4 ft: SAND, (SW); Moderate yellowish brown (10YR4/5) changing to Dark yellowish orange (10YR6/6) with Grayish orange (10YR7/4) at 5.7', fine to medium grained, poorly sorted, soft, moist.</p> <p>6.4 - 7.4 ft: Sandy SILT, (ML); Light brown (5YR6/6), silt layers are 2 - 3 cm thick, sand is very fine grained, low plasticity, firm, slightly moist; layer of Clayey Sand, Pale olive (10Y6/2), slightly plastic, stiff, between 6.4 - 6.6'.</p>	<p>Complete borehole number is B3890R366.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted for gamma-logging.</p> <p>PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.</p>
SS	2.0	1.0	4	8				33.0					
			4	8				32.0					
SS	2.0	1.7	8	8				31.0	5				
			10	20				30.8					
SS	2.0	1.4	10	25				29.4					
			25	30				29.0					
			30	32				28.6					
								27.6					
								27.0					

TOTAL DEPTH = 8.0 FT.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

62 Trudy Drive

Last Update: 03-20-92

HOLE NO. R366



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501-138	1 OF 1	R367					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
62 Trudy Drive			N 1890.0; E 2493.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-22-90	10-22-90	Hydro Group, Inc.	Tripod		3.5"	10.0	0.0	10.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
6.2/62*		0	5	NA	35.0	-9' ATD / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:									
140 lbs/30 in		none		Stephen Knuttel									
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
SS	2.0	0.7	1					35.0				0.0 - 0.7 ft: Silty SAND, (SM); Grayish brown (5YR3/2), minor gravel, soft, slightly moist (Fill?).	Complete borehole number is B3890R367.
SS	2.0	1.6	1					34.3				2.0 - 5.0 ft: Gravelly, Sandy SILT (ML); Moderate reddish brown (10R4/6) changing to Very dusky red (5R4/2) at 2.7', and to Dark reddish brown (10R3/4) at 4.0', gravel is primarily subangular sandstone, soft to moderately firm, moist; layer of Sandy Gravel, Dark yellowish brown (10YR4/2), primarily granitic gravel, loose, between 2.0 - 2.4'; Silty Sand between 2.4 - 2.7'; roots present between 2.7 - 3.6' (Fill?).	Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	9					33.0				5.0 - 7.2 ft: Clayey SILT, (ML); Olive black (5Y2/1), mottled with Dark yellowish brown (10YR4/2) between 6.6 - 7.2'; layer of Sandy Silt, Very dusky red (10R2/2), with minor subrounded gravel between 6.0 - 6.6'; minor sand between 5.0 - 5.3'; low to medium plasticity, moist.	
SS	2.0	1.9	4					31.4				7.2 - 7.9 ft: Interlayered SAND and Silty SAND, (SP & SM); Light olive gray (5Y6/1) to Greenish gray (5GY6/1), fine to medium sand, moderately well sorted within the layers, layers 1 - 2 cm thick, firm, moist.	
SS	2.0	1.7	9					31.0				8.0 - 8.3 ft: Clayey SILT, (ML); Grayish black (N2), high plasticity, soft, moist.	
			6					30.0	5			8.3 - 8.5 ft: Silty SAND, (SM); Greenish gray (5GY6/1), sand is very fine grained, moderately well sorted, firm, wet.	
			11					29.7				8.5 - 9.7 ft: SAND, (SP); Moderate brown (5YR4/4), fine grained, well sorted, firm, moist.	
			27					29.0				TOTAL DEPTH = 10.0 FT.	
			6					28.4					Borehole enlarged by driving 3.5" OD split spoon to depth.
			11					27.8					3" PVC casing inserted for gamma-logging.
			27					27.1					PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.
			9					27.0					* Core recovery refers to total soil & rock sample.
			12					26.7					Ground elevation estimated from site topographic map.
			35					26.5					Description & classification by visual examination of sample.
			32					25.3					Colors from "Rock-Color Chart" (GSA, 1948).
								25.0	10				

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

62 Trudy Drive

Last Update: 03-20-92

HOLE NO. R367



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501-138
 SHEET NO.: 1 OF 1
 HOLE NO.: R368

SITE: 62 Trudy Drive
 COORDINATES: N 1892.0; E 2506.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 10-22-90
 COMPLETED: 10-22-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Tripod
 SIZE: 3.5"
 OVERBURDEN: 10.0
 ROCK (FT.): 0.0
 TOTAL DEPTH: 10.0

CORE RECOVERY (FT./%): 7.5/75%
 CORE BOXES: 0
 SAMPLES: 5
 EL. TOP CASING: NA
 GROUND EL.: 35.0
 DEPTH/EL. GROUND WATER: -9' ATD
 DEPTH/EL. TOP OF ROCK: NA/NA

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.1	2 4 7				35.0			0.0 - 0.5 ft: TOPSOIL; Silty Sand, (SM); Dusky brown (5YR2/2), with roots, soft, moist.	Complete borehole number is B3890R368. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.5	6 5 3 4				34.5			0.5 - 7.3 ft: Gravely, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly to moderately sorted; increased gravel content between 4.7 - 5.3', gravel is primarily sandstone, subangular; moderately firm to firm, slightly moist to moist (Fill?).	
SS	2.0	1.3	13 20 14 10				33.0				
SS	2.0	1.6	5 6 6 5				31.5				
SS	2.0	2.0	8 12 15 17				31.0				
							29.7	5			
							29.0				
							27.7				
							27.4				
SS	2.0	2.0	8 12 15 17				27.0			7.3 - 8.3 ft: Clayey SILT, (ML); Olive black (5Y2/1) mottled with grayish red (10R4/2), medium plasticity, firm, moist.	
							26.7			8.3 - 8.9 ft: Silty, Gravely SAND, (SW); Moderate reddish brown (10R4/6), sand is fine to medium grained, poorly sorted, gravel is sandstone, soft, wet.	
							26.1				
							25.3			8.9 - 10.0 ft: SAND, (SP); Light olive gray (5Y5/2); fine grained grading with depth to medium grained, moderately well sorted within the layers, firm, moist to wet; layer of Clayey Sand, Pale olive (10Y6/2), low plasticity, between 9.7 - 9.9'.	
							25.1	10			
							25.0				

TOTAL DEPTH = 10.0 FT.

SS = SPLIT SPOON; NQ = CORE BARREL;
 HX = HAND AUGER; O = OTHER

SITE: 62 Trudy Drive
 Last Update: 03-20-92

HOLE NO.: R368



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R369
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
62 Trudy Drive			N 1871.0; E 2511.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-22-90	10-22-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.5/69*		0	4	NA	35.0	-7' ATD NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME IN MIN.							
SS	2.0	1.6	5 5 7 9				35.0						
SS	2.0	1.2	7 9 15 12				34.2 33.4 33.0					0.0 - 0.8 ft: TOPSOIL; Sandy Silt, (ML); Blackish red (5R2/2), with roots, firm, slightly moist. 0.8 - 6.7 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), with varying amounts of angular sandstone gravel, firm, slightly moist, soft and saturated between 6.0 - 6.7' (Fill?).	Complete borehole number is B3890R369. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	5 4 5 3				31.8 31.0 30.0	5					
SS	2.0	1.7	5 7 9 15				29.0 28.3 27.3 27.0					6.7 - 7.7 ft: SAND, (SW); Blackish red (5R2/2) changing to Greenish black (5GY2/1) at 7.2', medium grained, poorly to moderately sorted, firm, moist to wet.	Hole caved in to -4', coring stopped Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.
TOTAL DEPTH = 8.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

62 Trudy Drive

Last Update: 03-20-92

HOLE NO. R369



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R370
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
62 Trudy Drive			N 1,847.0; E 2,530.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-23-90	10-23-90	Hydro Group, Inc.	Tripod		3.5"	10.0	0.0	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
7.1/71*		0	5	NA	35.0	ND / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.3	3	66				35.0					
			6					34.5				0.0 - 0.5 ft: TOPSOIL; Sandy Silt, (ML); Grayish Black (N2), with roots, moderately firm, moist.	Complete borehole number is B3890R370.
			9					33.7				0.5 - 8.9 ft: Gravelly, Sandy SILT, (SM); Dark reddish brown (10R3/4), mottled with Blackish red (5R2/2) between 6.0 - 8.9'; gravel is primarily sandstone, subangular, content decreases with depth; firm to soft with depth, moist, wet below 6.0', sharp contact with layer below (Fill?).	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.3	9	99				33.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
			9					31.7					
SS	2.0	1.1	9	1245				31.0					
			12					29.9	5				
			4					29.0					
SS	2.0	1.5	2	336				27.5					
			6					27.0					
SS	2.0	1.9	8	81012				26.1					
			8					25.1				8.9 - 9.9 ft: Clayey SAND, (SC); Light olive gray (5Y5/2) to Grayish olive (10Y4/2), mottled with Dark yellowish orange (10YR6/6) between 9.5 - 9.9"; interlayered fine and medium sand, moderately well sorted within the layers, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
			10					25.0	10				Borehole enlarged by driving 3.5" OD split spoon to depth.
TOTAL DEPTH = 10.0 FT.												3" PVC casing inserted for gamma-logging.	
TOTAL DEPTH = 10.0 FT.												PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	62 Trudy Drive	Last Update:	10-05-92	HOLE NO.	R370
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.		SHEET NO.		HOLE NO.			
62 Trudy Drive				N 1,847.0; E 2,505.0		14501		1 OF 1		R371			
SITE				COORDINATES				ANGLE FROM HORIZ		BEARING			
10-23-90				10-23-90				Vertical		-----			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN			
10-23-90		10-23-90		Hydro Group, Inc.		Tripod		3.5"		10.0			
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER			
8.4/84*		0		5		NA		35.0		-9' ATD NA			
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:					
140 lbs/30 in				none				Stephen Knuttel					
SAMP TYPE AND DIA.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)	
												DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.7	2					35.0				0.0 - 1.0 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), with roots, soft, slightly moist (Fill?).	
			4					34.0				1.0 - 5.0 ft: Gravelly, Sandy SILT, (ML); Dark reddish brown (10R3/4); gravel is sandstone, subangular; soft to moderately firm, moist (Fill?).	
			13					33.3				Hole advanced to depth by 3" OD split spoon samplers.	
			15					33.0					
SS	2.0	1.4	5					31.6				Borehole sampled and gamma-logged by TMA/Eberline Corp.	
			11					31.0					
			13					30.0				Borehole enlarged by driving 3.5" OD split spoon to depth.	
			10					29.7					
			10					30.0	5			3" PVC casing inserted for gamma-logging.	
			10					29.6					
SS	2.0	2.0	7					29.0				PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.	
			10					27.3					
			14					27.0				* Core recovery refers to total soil & rock sample.	
			17					27.0					
			17					27.0				Ground elevation estimated from site topographic map.	
			22					25.1					
			22					25.0	10			Description & classification by visual examination of sample.	
								25.0					
TOTAL DEPTH = 10.0 FT.												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NO = CORE BARREL; SITE 62 Trudy Drive Last Update: 10-05-92 HOLE NO. R371
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R372
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
62 Trudy Drive			N 1895.0; E 2529.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-23-90	10-23-90	Hydro Group, Inc.	Tripod		3.5"	12.0	0.0	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
8.3/68*		0	6	NA	35.0	ND / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						P.S.F.	TIME MIN.						
SS	2.0	1.6	4	75				35.0					
			5					34.5				0.0 - 0.5 ft: Sandy SILT, (ML); Brownish black (5YR2/1), with roots, soft, moist.	Complete borehole number is B3890R372.
			6					33.4				0.5 - 9.7 ft: Gravely, Sandy SILT, (ML); Dark reddish brown (10R3/4), gravel is sandstone, subangular, content decreases with depth; 1 cm layer of Clayey Silt, Grayish black (N2), between 7.4 - 7.5'; firm, moist (Fill?).	
SS	2.0	0.6	2	33				33.0					Hole advanced to depth by 3" OD split spoon samplers.
			3	36				32.4					
SS	2.0	1.6	9	99				31.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
			10					29.4	5				
SS	2.0	1.8	6	89				29.0					
			9					27.2					
SS	2.0	1.9	11	18				27.0					
			26					25.3					
SS	2.0	0.8	30	32				25.1	10			9.7 - 9.9 ft: Silty SAND, (SM); Dark greenish gray (5GY4/1), sand is fine grained, moderately sorted, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
			32					25.0				10.0 - 10.8 ft: Interlayered SAND and Silty SAND, (SP & SM); Dark yellowish brown (10YR4/2) to Moderate yellowish brown (10YR5/4), sand is very fine to fine grained, layers 1 - 2 cm thick, moderately well sorted within the layers, firm, moist.	
			35					24.2					
								23.0					

TOTAL DEPTH = 12.0 FT.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	62 Trudy Drive	Last Update: 03-20-92	HOLE NO. R372
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501-138	1 OF 1	C375				
SITE			COORDINATES			ANGLE FROM HORIZ/BEARING						
62 Trudy Drive			N 1880.0; E 2488.0			Vertical						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-24-90	10-24-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.1/76*		0	4	NA	35.0	/ none ATD		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS	CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.							TIME MIN.
SS	2.0	1.6	1				35.0					
			2				33.5					
			1				33.0					
SS	2.0	1.9	1									
			1									
			2									
			3									
SS	2.0	1.3	4				31.1					
			7				31.0					
			10				30.2					
			15				30.0					
							29.7					
SS	2.0	1.4	3				29.0					
			17				28.7					
			25									
			34									
							27.6					
							27.0					
(Template: MYWD)												
TOTAL DEPTH = 8.0 FT.												



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501-138	SHEET NO.	1 OF 1	HOLE NO.	R376
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
62 Trudy Drive			N 1873.0; E 2575.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-25-90	10-25-90	Hydro Group, Inc.	Tripod		3.5"	12.0	0.0	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
7.8/65*		0	6	NA	35.0	-9' ATD NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

Stephen Knuttel *[Signature]*

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.6	2 10 13 20				35.0 34.7				0.0 - 0.3 ft: TOPSOIL; Sandy Silt, (ML); Grayish black (N2), with roots, moderately firm, moist.	Complete borehole number is B3890R376.
SS	2.0	1.3	13 20 19 18				33.4 33.0				0.3 - 6.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted; gravel is primarily sandstone, subangular; firm, slightly moist (Fill?).		Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	0.8	13 5 6 6				31.7 31.0 30.2				6.4 - 7.1 ft: Clayey SILT, (ML); Black (N1); abundant wood fragments between 6.4 - 6.6'; minor roots below; high plasticity, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	5 4 4 3				29.0 28.6				8.0 - 8.7 ft: Silty CLAY, (CL); Olive gray (5Y5/2), minor layering of Grayish black (N2), mottled with Dark yellowish orange (10YR6/6); glass and wood fragments between 8.4 - 8.5'; high plasticity, firm, moist.	
SS	2.0	1.5	10 24 27 30				27.0 26.3				8.7 - 10.7 ft: Sandy SILT grading to SAND, (ML-SP); Moderate yellowish brown (10YR5/4) to Dusky yellow (5Y6/4), silt with very fine sand grading to medium sand at 10.3', minor layering, moderately well sorted within the layers, firm, slightly moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
SS	2.0	1.5	17 24 24 27				25.5 25.0 24.3				10.7 - 11.5 ft: SILT, (ML); Light brown (5YR5/6), low plasticity, very firm, slightly moist.	
							23.5 23.0				TOTAL DEPTH = 12.0 FT.	3" PVC casing inserted to 9.9' for gamma-logging.
												PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	62 Trudy Drive	Last Update: 03-20-92	HOLE NO. R376
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501-138

SHEET NO.

1 OF 1

HOLE NO.

R377

SITE

62 Trudy Drive

COORDINATES

N 1886.0; E 2560.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-25-90

COMPLETED

10-25-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

10.9

ROCK (FT.)

0.0

TOTAL DEPTH

10.9

CORE RECOVERY (FT./%)

8.0/73%

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

35.0

DEPTH/EL. GROUND WATER

none ATD / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
SS	2.0	1.4	2				35.0				
			3				34.7			0.0 - 0.3 ft: TOPSOIL; Silty Sand, (SM); Grayish black (N2), with roots, moderately firm, moist.	<p>Complete borehole number is B3890R377.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p>
SS	2.0	1.5	3				33.6			0.3 - 9.3 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted; gravel is primarily sandstone, subangular, content decreases with depth; soft to moderately firm, moist, sharp irregular contact with layer below (Fill?).	
			5				33.0				
			6				31.5				
			6				31.0				
SS	2.0	1.3	4				29.7	5			
			4				29.0				
			4				27.9				
			5				27.0				
SS	2.0	2.0	4				27.0				
			4				25.7				
			9				25.1				
			27				24.8				
SS	0.9	0.7	25				24.3	10		9.3 - 9.9 ft: Silty CLAY, (CL); Grayish black (N2); high plasticity, firm, moist, sharp contact.	<p>Spoon refusal at 10.9'.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted to 9.8' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.</p>
			50/5"				24.1			9.9 - 10.2 ft: SAND, (SW); Olive gray (5Y4/1), fine grained, moderately sorted, minor silt, firm, moist.	
										10.2 - 10.7 ft: SILT, (ML); Light brown (5YR5/6) mottled with Dark yellowish orange (10YR6/6), minor very fine grained sand, low plasticity, very firm, slightly moist.	

TOTAL DEPTH = 10.9 FT.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE 62 Trudy Drive

Last Update: 03-20-92 HOLE NO. R377



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501-138	1 OF 1	R378			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
62 Trudy Drive			N 1894.0; E 2566.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-25-90	10-25-90	Hydro Group, Inc.		Tripod		3.5"	10.0	0.0	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.4/64*		0	5	NA	35.0	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						
SAMP AND DIAM.	SAMP. ADV. LEN CORE	SAMP REC. CORE LEN	SAMP RECOV. % CORE	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M	PRESS. P.S.I.							TIME MIN.
SS	2.0	1.5	1 4 11 12			35.0 34.7			0.0 - 0.3 ft: TOPSOIL; Silty Sand, (SM); Grayish black (N2), with roots, moderately firm, moist.	Complete borehole number is B3890R378.	
SS	2.0	1.2	14 12 11 5			33.5 33.0 31.8			0.3 - 6.9 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted; gravel is primarily sandstone, subangular; soft to moderately firm, moist (Fill?).	Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.2	5 5 5			31.0 29.8	5				
SS	2.0	1.0	5 5 8 5			29.0 28.1 28.0					
SS	2.0	1.5	4 17 25 25			27.0 26.9 26.5			6.9 - 8.1 ft: SAND, (SW); Olive gray (5Y4/1), fine to medium grained, moderately sorted, minor silt, firm, moist, sharp contact with layer below.	Minor sediment found in core catcher; 9.5 - 9.55'.	
						25.6 25.5 25.0	10		8.1 - 8.5 ft: Gravelly, Clayey SILT, (ML); Olive black (5Y2/1), with sandstone gravel, Dark reddish brown (10R3/4); abundant wood fragments, low plasticity, moderately firm, moist. 8.5 - 9.5 ft: SAND, (SW); Olive gray (5Y4/1), fine grained, moderately well sorted; layer of Sandy Silt, Light olive brown (5Y5/6), sand is very fine grained, between 9.1 - 9.2'; firm, moist. 9.5 - 9.55 ft: SILT, (ML); Light brown (5YR5/6) mottled with Dark yellowish orange (10YR6/6).	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 9.7' for gamma-logging. PVC casing was removed after logging and hole was grouted to -5" below surface and remaining hole backfilled with drilling spoils.	
TOTAL DEPTH = 10.0 FT.											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER SITE: 62 Trudy Drive Last Update: 03-20-92 HOLE NO. R378											



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP		14501-138	1 OF 1	R382		
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
62 Trudy Drive			N 1859.0; E 2563.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
10-29-90	10-29-90	Hydro Group, Inc.		Tripod		3.5"	12.0	0.0	12.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
8.2/68*		0	6	NA	35.0	/ none ATD		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					
(Template: MYWD)										
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE
SS	2.0	1.8	3	5			35.0			
			9	20			34.6			
							33.4			
SS	2.0	1.4	11	13			33.0			
			15	17			31.6			
SS	2.0	1.1	11	6			31.0	5		
			6	5			29.9			
SS	2.0	1.3	13	11			29.0			
			6	8			27.7			
SS	2.0	1.3	2	15			27.0			
			17	25			26.7			
							25.7			
SS	2.0	1.5	9	15			25.0	10		
			16	20			24.1			
							23.5			
							23.0			
<p>0.0 - 0.4 ft: TOPSOIL; Silty Sand, (SM); Blackish red (5R2/2), sand is fine grained, with roots, moderately firm, moist.</p> <p>0.4 - 5.1 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted; gravel is primarily sandstone, subangular, with minor igneous and metamorphic material between 4.0 - 5.1'; soft to moderately firm, moist (Fill?).</p> <p>6.0 - 7.3 ft: Clayey SILT, (ML); Grayish black (N2); as sedimentary clasts within matrix of above, clasts are 0.1 - 0.2' diameter, firm.</p> <p>8.0 - 8.3 ft: SAND, (SW); Olive gray (5Y4/1), medium grained, moderately sorted, with clay; wood fragments, Black (N1), present; firm, moist.</p> <p>8.3 - 10.9 ft: Silty SAND, (SM); Light olive brown (5Y5/6) mottled with Pale olive (10Y6/2) changing to Light olive gray (5Y5/2) at 10.5, sand is fine grained, moderately sorted between 8.3 - 10.5, well sorted below, finely layered, firm, moist.</p> <p>10.9 - 11.5 ft: SILT, (ML); Moderate brown (5YR4/4), low plasticity, firm, moist.</p> <p>TOTAL DEPTH = 12.0 FT.</p>										
<p>Complete borehole number is B3890R382.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Minor sediment found in core catcher; 7.3 - 7.35'.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted to 9.5' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>										
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			62 Trudy Drive		Last Update: 03-20-92	HOLE NO. R382	



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R383**

SITE: **62 Trudy Drive** COORDINATES: **N 2,575.0; E 1,848.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-29-90** COMPLETED: **10-29-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Tripod** SIZE: **3.5"** OVERBURDEN: **8.0** ROCK (FT.): **0.0** TOTAL DEPTH: **8.0**

CORE RECOVERY (FT./%): **3.0/38*** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **35.0** DEPTH/EL. GROUND WATER: **7 / none ATD** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	4	6				35.0				<p>(Template: MYWD)</p> <p>0.0 - 0.4 ft: TOPSOIL; Silty Sand, (SM); Blackish red (5R2/2), sand is fine grained, with roots, moderately firm, moist.</p> <p>0.4 - 3.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted; gravel is primarily sandstone, subangular; firm, moist (Fill?).</p> <p>Complete borehole number is B3890R383.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Hole abandoned at 8.0' because of insufficient recovery.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted to 6.5' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with drilling spoils.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>	
			13					34.6					
			19					33.4					
			20					33.0					
			19					31.6					
SS	2.0	0.0	25	30					5				
			30										
			40										
SS	2.0	0.0	15	17									
			25										
			30					27.0					
TOTAL DEPTH = 8.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **62 Trudy Drive** Last Update: **09-23-92** HOLE NO.: **R383**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.					
SITE 62 Trudy Drive				COORDINATES N 1,848.0; E 2,574.0	14501	1 OF 1	R384					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ANGLE FROM HORIZ	BEARING					
10-29-90	10-29-90	Hydro Group, Inc.	Tripod	3.5"	10.0	Vertical	-----					
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	ROCK (FT.)	TOTAL DEPTH					
7.1/71*	0	5	NA	35.0	↓ / none ATD ↓ / NA	0.0	10.0					
SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:									
140 lbs/30 in	none		Stephen Knuttel									
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	TIME IN MIN.						
SS	2.0	1.8	5 15				35.0 34.7				0.0 - 0.3 ft: TOPSOIL; Silty Sand, (SM); Grayish black (N2), with roots, moderately firm, moist.	Complete borehole number is B3890R384.
SS	2.0	1.0	15 20 21 18				33.2 33.0 32.0				0.3 - 6.8 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4) changing to Blackish red (5Y2/2) at 6.0', sand is fine to medium grained, poorly sorted; gravel is primarily sandstone, subangular; roots present between 4.0 - 5.3'; clasts composed of Silty Sand, Black (N1), common between 2.0 - 3.0'; soft to moderately firm, moist (Fill?).	Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	8 11 11 21				31.0 29.7	5				
SS	2.0	1.5	8 9 10				29.0 28.2				6.8 - 7.5 ft: Clayey SILT Grading to SAND, (ML - SW); Black (N1) to Olive black (5Y2/1) gradually changing to Light olive gray (5Y5/2) below 7.0'; with roots and wood fragments between 6.8 - 7.0'; sand is fine grained, finely layered, firm, moist.	
SS	2.0	1.5	nr				27.5 27.0 26.2				8.0 - 8.8 ft: Sandy, Clayey SILT, (ML); Grayish olive (10Y4/2) mottled with Light olive brown (5Y5/6), sand is very fine grained, finely layered, firm, moist.	
							25.5 25.0	10			8.8 - 9.5 ft: SILT, (ML); Dark yellowish brown (10YR4/2), interlayered with minor fine Sand and Clayey Silt, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
TOTAL DEPTH = 10.0 FT.											3" PVC casing inserted to 8.2' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER											nr = not recorded. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SITE 62 Trudy Drive				Last Update: 10-05-92				HOLE NO. R384				



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501-138	SHEET NO. 1 OF 1	HOLE NO. R385
SITE 62 Trudy Drive			COORDINATES N 1847.0; E 2550.0			ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 10-29-90	COMPLETED 10-29-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 9.5	ROCK (FT.) 0.0	TOTAL DEPTH 9.5
CORE RECOVERY (FT./%) 5.7/60*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 35.0	DEPTH/EL. GROUND WATER 7 / none ATD		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	P.S.F.	TIME IN MIN.						
SS	2.0	1.3	3 7 7 12				35.0				(Template: NYWD)	
SS	2.0	0.5	9 7 8 9				34.5 33.5 33.0 32.5				0.0 - 0.5 ft: TOPSOIL; Silty Sand, (SM); Grayish black (N2), with roots and gravel, moderately firm, moist. 0.5 - 7.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4); sand is fine to medium grained, poorly sorted; gravel is primarily sandstone, subangular; soft to moderately firm, moist (Fill?).	Complete borehole number is B3890R385. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.2	7 4 4 5				31.0 29.8	5				
SS	2.0	1.6	3 6 17 18				29.0 27.6 27.4 27.0					
SS	1.5	1.1	10 15 50/6*				26.1 25.9 25.5				7.4 - 8.9 ft: Interlayered Clayey SILT and SAND, (ML & SW); Grayish olive (10Y4/2) to Dusky yellow green (5GY5/2), sands are medium grained, moderately sorted, layers 1 - 2 cm thick, firm, moist. 8.9 - 9.1 ft: SILT, (ML); Dusky yellow (5Y6/4) to Moderate brown (5YR4/4), very firm, slightly moist.	Spoon refusal at 9.5'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 9.1' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 9.5 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 62 Trudy Drive	Last Update: 03-20-92	HOLE NO. R385
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GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
										FUSRAP		14501-138	1 OF 1	R430
SITE					COORDINATES					ANGLE FROM HORIZ		BEARING		
62 Trudy Drive					N 1873.0; E 2586.0					Vertical		-----		
BEGUN		COMPLETED		DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-3-91		1-3-91		Hydro Group, Inc.			Tripod		3.5"	9.2	0.0	9.2		
CORE RECOVERY (FT./%)			CORE BOXES		SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.5/71*			0		5	NA	35.0	-8' ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:						
140 lbs/30 in				none				Stephen Knuttel						
(Template: MYWD)														
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS RECOVERY	WATER PRESSURE TESTS	LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	1.6	5 6 19 20					35.0				0.0 - 0.5 ft: TOPSOIL; Sandy Silt, (ML); Grayish brown (5YR3/2), with roots, firm, moist.	Complete borehole number is B3890R430.	
SS	2.0	1.3	19 20 21 20					33.4 33.0				0.5 - 5.0 ft: Gravelly, Silty SAND, (SM); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 2.5'; sand is fine to medium grained, poorly sorted; gravel is primarily sandstone subangular; firm, slightly moist (Fill?).	Hole advanced to depth by 3" OD split spoon samplers.	
SS	2.0	1.4	12 12 15 17					31.7 31.0				5.0 - 5.4 ft: Clayey SILT, (ML); Grayish black (N2) changing to Greenish black (5G2/1) at 5.2'; medium plasticity, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	1.2	0.8	33 50 50/3"					30.0 29.6 29.0	5			6.0 - 8.2 ft: SAND, (SW); Dark greenish gray (5G4/1) mottled with Grayish red (10R4/2), fine grained, moderately sorted; minor silt and clay, content increases with depth; firm, moist.		
SS	2.0	1.4	25 25 30 35					28.2 27.8				8.2 - 8.6 ft: SILT, (ML); Moderate yellowish brown (10YR5/4) to Dusky yellow (5Y6/4), with very fine grained sand, well sorted, firm, moist.		
								26.8 26.4 25.8				TOTAL DEPTH = 9.2 FT.	Spoon refusal at 9.2'. Borehole enlarged by driving 3.5" OD split spoon to depth.	
													3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
													* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

62 Trudy Drive

Last Update: 03-20-92

HOLE NO. R430



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.
				FUSRAP		14501-138	1 OF 1	R431
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING
62 Trudy Drive			N 1895.0; E 2576.0			Vertical		-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
1-3-91	1-3-91	Hydro Group, Inc.	Tripod		3.5"	10.0	0.0	10.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK
6.4/64*		0	5	NA	35.0	/ none ATD / NA		NA/NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:			
140 lbs/30 in		none			Stephen Knuttel			
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD)
								DESCRIPTION AND CLASSIFICATION
SS	2.0	1.6	2 5 15 30		35.0 34.5			0.0 - 0.5 ft: TOPSOIL; Silty Sand, (SM); Grayish brown (5YR5/2), with roots, moderately firm, moist.
SS	2.0	1.7	14 15 15 17		33.4 33.0 31.9			0.5 - 6.1 ft: Gravelly, Silty SAND, (SM); Moderate reddish brown (10R4/6) changing to Dark reddish brown (10R3/4) at 2.0', sand is fine to medium grained, moderately sorted; gravel is primarily sandstone, subangular; soft to moderately firm, moist (Fill?).
SS	2.0	0.7	4 6 8 8		31.0 30.3	5		
SS	2.0	1.3	4 8 25 45		29.0 28.9 28.4 27.7			6.1 - 6.6 ft: Silty CLAY, (CL); Black (N1) changing to Grayish black (N2) at 6.3', fine roots between 6.1 - 6.3', medium plasticity below 6.3', firm, moist.
SS	2.0	1.1	18 25 30 40		27.0 25.9			6.6 - 7.3 ft: Silty SAND, (SM); Light olive gray (5Y5/2), sand is very fine to fine grained, moderately well sorted, minor clay, firm, moist.
					25.0	10		8.0 - 9.1 ft: Sandy SILT, (ML); Light brown (5YR5/6) mottled with Light olive gray (5Y5/2) and Light olive brown (5Y5/6), sand is very fine grained, firm, moist.
								TOTAL DEPTH = 10.0 FT.
								<p>Complete borehole number is B3890R431.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted to 9.0' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was grouted to -3' below surface and remaining hole backfilled with drilling spoils.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		62 Trudy Drive		Last Update: 05-20-92 HOLE NO. R431



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501-138	1 OF 1	R432					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
62 Trudy Drive			N 1895.0; E 2586.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
1-3-91	1-3-91	Hydro Group, Inc.	Tripod		3.5"	9.7	0.0	9.7					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
5.4/56*		0	5	NA	35.0	V / none ATD NA / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.2	4					35.0					Complete borehole number is B3890R432. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 9.7'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 9.0' for gamma-logging. PVC casing was removed after logging and hole was grouted to -3' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			8					34.7			0.0 - 0.3 ft: TOPSOIL; Silty Sand, (SM); Grayish brown (5YR3/2), with roots, moderately firm, moist.		
SS	2.0	1.0	9					33.8					
			10					33.0			0.3 - 4.9 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted; gravel is primarily sandstone, subangular; soft to moderately firm, moist (Fill?).		
			4					32.0					
SS	2.0	0.9	3					31.0					
			3					30.1					
			4					29.0					
SS	2.0	1.3	9					28.7			6.0 - 6.3 ft: Clayey SILT, (ML); Black (N1), fine roots present, minor debris, firm, moist.		
			18					28.0					
			30					27.7			6.3 - 7.0 ft: Silty SAND, (SM); Light olive gray (5Y5/2) mottled with Light olive brown (5Y5/6), sand is fine grained, moderately well sorted, firm, moist.		
SS	1.7	1.0	7					27.0					
			50					26.4			7.0 - 8.6 ft: Sandy SILT, (ML); Light olive gray (5Y5/2), sand is very fine grained, content decreases with depth; 1 cm layer of clean fine Sand between 8.1 - 8.2'; firm, moist.		
			35					26.0					
			50/3"					25.3			8.6 - 9.0 ft: Silty SAND, (SM); Pale brown (5YR5/2) to Pale yellowish brown (10YR6/2), sand is fine grained, moderately well sorted, firm, moist.		
											TOTAL DEPTH = 9.7 FT.		
SS = SPLIT SPOON; NO = CORE BARREL; SITE											62 Trudy Drive	last Update: 03-20-92	HOLE NO. R432
HX = HAND AUGER; 0 = OTHER													



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			FUSRAP	14501-138	1 OF 1	R437
Trudy Drive (near 62)			COORDINATES	N 1895.0; E 2596.0		ANGLE FROM HORIZ
BEGUN			DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN
1-10-91			1-10-91	Hydro Group, Inc.	8"	10.0
CORE RECOVERY (FT./%)			CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.
6.0/60*			0	5	NA	35.0
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:	
140 lbs/30 in			none		Stephen Knuttel	

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BL. ONS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.							
									35.0				(Template: MYWD)	
SS	1.5	1.0	18	26	30				34.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R437.
SS	2.0	0.8	5	6	5				33.5				0.5 - 4.3 ft: Silty, Gravelly SAND (SW); Moderate reddish brown (10R4/6) to Dark reddish brown (10R3/4); sand is fine to medium grained, poorly sorted; gravel is primarily sandstone, subangular; soft to moderately firm, moist (Fill?).	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.2	3	4	4				33.0				4.3 - 6.3 ft: Clayey SILT (ML); Olive black (5Y2/1) to Grayish black (N2), medium plasticity, firm, moist.	Augered to 4.0'.
SS	2.0	1.4	3	4	4				32.2				6.0 - 6.8 ft: Silty CLAY (CL); Olive black (5Y2/1) with minor Greenish gray (5GY6/1), medium plasticity, firm, moist.	Augered to 6.0'.
SS	2.0	1.6	25	26	27				29.8	5			6.8 - 9.1 ft: Silty SAND interlayered with SILT (SM-ML); Light olive gray (5Y5/2) to Dark yellowish brown (10YR4/2) changing to Light brown (5YR5/6) at 8.0', sand is fine grained, moderately sorted, silt content increases with depth, firm, moist.	Augered to 8.0'.
									29.0				9.1 - 9.6 ft: SAND (SP); Moderate brown (5YR4/4); coarse grained, moderately sorted between 9.1 - 9.3'; fine to medium grained, moderately well sorted below; clean, moderately firm, moist to wet.	Augered to total depth of 10.0'.
									31.0					3* PVC casing inserted to total depth for gamma-logging.
									30.7					PVC casing was removed after logging and hole was backfilled with drilling spoils.
									27.6					
									27.0					
									25.9					
									25.4					
									25.0	10				
TOTAL DEPTH = 10.0 FT.														

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE Trudy Drive (near 62)

Last Update: 03-20-92

HOLE NO. R437



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
136 West Central Avenue				FUSRAP		14501	1 OF 1	R641					
SITE		COORDINATES				ANGLE FROM HORIZ		BEARING					
136 West Central Avenue		N 10120.0; E 10080.0				Vertical		-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)					
6-18-91	6-18-91	Hydro Group, Inc.		Tripod		3.5"	6.5	0.5					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
6.3/90*		0	4	NA	55.0	none ATD NA		6.5/48.5					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook								
SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	3 5 4 4					55.0 54.6			0.0 - 0.4 ft: FILL; Dusky yellowish brown (10YR2/2), with glass and brick fragments up to -10 mm, moist.	Complete borehole number is B3891R641.	
SS	2.0	1.9	6 7 10 12					53.5 53.0			0.4 - 6.5 ft: Clayey SILT, (ML); Dark yellowish brown (10YR4/2) changing to Moderate yellowish brown (10YR5/4) at 2.8', mottled with Pale yellowish brown (10YR6/2) below 3.0', very fine grained, clay content increasing with depth, cobbles up to 25 mm between 3.0 - 3.9', interlayered with -20% sandstone between 3.9 - 6.5', low to medium plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.	
SS	2.0	2.0	11 9 17 38					51.1 51.0					
SS	1.0	0.9	39 50/6"					48.5 48.1 48.0			6.5 - 6.9 ft: SANDSTONE; Dark reddish brown (10R3/4), medium grained, brittle, weathered.	Spoon refusal at 7.0'. Borehole enlarged by driving 3.5" OD split spoon to depth.	
TOTAL DEPTH = 7.0 FT.												3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.	
* Core recovery refers to total soil & rock sample.													
Ground elevation estimated from site topographic map.													
Description & classification by visual examination of sample.													
Colors from "Rock-Color Chart" (GSA, 1948).													
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				136 West Central Avenue		Last Update: 03-24-92		HOLE NO. R641	



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R642

SITE
136 West Central Avenue

COORDINATES

N 10130.0; E 10040.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN
6-18-91

COMPLETED
6-18-91

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL
Tripod

SIZE
3.5"

OVERBURDEN
7.6

ROCK (FT.)
0.9

TOTAL DEPTH
8.5

CORE RECOVERY (FT./%)
6.5/76*

CORE BOXES
0

SAMPLES
5

EL. TOP CASING
NA

GROUND EL.
55.0

DEPTH/EL. GROUND WATER
/ none ATD
/ NA

DEPTH/EL. TOP OF ROCK
7.6/7.4

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH
none

LOGGED BY:

Robert Cook

(Template: MYWD)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.1	1 1 2				55.0			0.0 - 0.9 ft: FILL; Sandy Silt, grass, with glass and slag.	Complete borehole number is B3891R642.
SS	2.0	1.8	3 6 9				54.1 53.9 53.0 52.5			0.9 - 2.5 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2), very fine grained, low plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	21 11 19 41				51.2 51.0			2.5 - 7.3 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4) changing to Moderate brown (5YR4/4) at 4.6', fine to medium grained, sand -70-80%, silt -20-30%, low plasticity, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.7	27 31 32 50				49.4 49.0	5			
SS	0.5	0.3	60/6"				47.7 47.4 47.3 47.0 46.7 46.5			7.3 - 7.6 ft: SAND, (SW); layered Dark gray (N3), Olive gray (5Y4/1) and Dark greenish gray (5GY4/1). 7.6 - 8.3 ft: SANDSTONE and Sandy SILT, (ML); Dark reddish brown (10R3/4), fine grained, no plasticity.	Spoon refusal at 8.5'. Borehole enlarged by driving 3.5" OD split spoon to depth.

TOTAL DEPTH = 8.5 FT.

3" PVC casing inserted for gamma-logging.
PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

136 West Central Avenue

Last Update:
03-24-92

HOLE NO.
R642



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R643
SITE 136 West Central Avenue		COORDINATES N 10175.0; E 10047.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 6-19-91	COMPLETED 6-19-91	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 13.4	ROCK (FT.) 0.6
CORE RECOVERY (FT./%) 11.0/79*		CORE BOXES 0	SAMPLES 8	EL. TOP CASING NA	GROUND EL. 55.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook	

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE CORE RECOVERY	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.2	1 4 2		55.0			0.0 - 1.2 ft: FILL ; Sandy silt, dusky yellowish brown (10YR2/2); mixed with slag, light olive gray (5Y6/1) mottled with light brown (5YR5/8); no plasticity, moist.	Complete borehole number is B3891R643.
SS	2.0	1.0	1 2 2 3		53.8 53.0 52.0			2.0 - 4.5 ft: Clayey SILT (ML) ; Dusky yellowish brown (10YR2/2), fine grained, silt -60%, clay -20%, sand -20%, medium plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	2.0	10 15 18 34		51.0 50.5	5		4.5 - 13.4 ft: Silty SAND (SM) ; Moderate brown (5YR4/4) changing to moderate yellowish brown (10YR5/4) at 6.8' and to dark yellowish brown (10YR4/2) at 12.0'; sand -70%, fine to medium grained, well sorted; silt -30%, content decreasing with depth; low plasticity, moist.	
SS	2.0	1.9	18 28 32 25		47.1 47.0 46.0				
SS	2.0	1.0	28 26 30 33		46.0				
SS	0.5	0.5	50/6"		45.0	10			
SS	1.5	1.4	45 20 27		43.1 43.0				Borehole enlarged by driving 3.5" OD split spoon to depth.
SS	2.0	2.0	15 18 17 22		41.6 41.0			13.4 - 14.0 ft: SANDSTONE ; Dark reddish brown (10R3/4), iron-oxide cement, blocky.	3" PVC casing inserted for gamma-logging.
								TOTAL DEPTH = 14.0 FT.	PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R643
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
136 West Central Avenue			FUSRAP	14501	1 OF 1	R644
SITE		COORDINATES			ANGLE FROM HORIZ	BEARING
6-19-91		N 10177.0; E 10071.0			Vertical	-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
6-19-91	6-19-91	Hydro Group, Inc.	Tripod	3.5"	7.2	0.4
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
6.4/84*	0	4	NA	55.0	↓ / none ATD ↓ / NA	7.2/47.8
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.7	5 3 4				55.0			0.0 - 1.0 ft: FILL; Sandy Silt, Dark yellowish brown (10YR6/2), grass, with brick fragments and slag.	Complete borehole number is B3891R644.
SS	2.0	1.1	2 4 4 4				53.3 53.0			1.0 - 3.1 ft: Clayey SILT, (ML); Moderate brown (5YR3/4 - 5YR4/4), very fine grained, silt -50-70%, clay -20-30%, sand -10-20%; no plasticity between 1.0 - 1.7', medium plasticity below; moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	2.0	2 9 16 10				51.9 51.0			4.0 - 5.3 ft: SAND, (SP); Moderate brown (5YR3/4), fine to medium grained, no plasticity, moist.	Spoon refusal at 7.5'.
SS	1.5	1.6	11 27 50/-6"				49.8 49.0	5		5.2 - 6.0 ft: Silty CLAY, (CL); Moderate brown (5YR3/4), very fine grained, clay -70%, silt -30%, high plasticity, moist. 6.0 - 7.2 ft: Silty SAND, (SM); Moderate brown (5YR4/4), very fine to fine grained, sand -70%, silt -30%, low plasticity, moist.	- Recovery in last spoon was > recorded interval driven; i.e. sample to 7.6'.
							47.8 47.4			7.2 - 7.6 ft: SANDSTONE; Dark reddish brown (10R3/4), hard, iron-oxide cement, blocky.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.
TOTAL DEPTH = 7.6 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R644
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R645

SITE
136 West Central Avenue

COORDINATES

N 10207.0; E 10040.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

6-19-91

COMPLETED

6-19-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

15.4

ROCK (FT.)

0.5

TOTAL DEPTH

15.9

CORE RECOVERY (FT./%)

13.6/86*

CORE BOXES

0

SAMPLES

9

EL. TOP CASING

NA

GROUND EL.

55.0

DEPTH/EL. GROUND WATER

7 / none ATD
NA

DEPTH/EL. TOP OF ROCK

15.4/39.6

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLKS. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.7	2 10 12 8				55.0		0.0 - 4.8 ft: FILL. 0.0 - 1.5 ft: Sandy silt; Dark reddish brown (10R3/4), grass, moist.	<p>Complete borehole number is B3891R645.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>4.8 - 6.6 ft: Silty CLAY, (CL); Dusky yellowish brown (10YR2/2), very fine grained, high plasticity, moist.</p> <p>6.6 - 15.4 ft: Silty SAND, (SM); Grayish orange (10YR7/4) to Pale yellowish brown (10YR6/2) to Moderate brown (5YR4/4) between 6.6 - 8.0', Moderate yellowish brown (10YR5/4) between 8.0 - 10.0' and 13.0 - 15.4', and Moderate brown (5YR4/4) between 10.0 - 13.0'; fine to medium grained, well sorted, silt content up to -30%, no plasticity, moist.</p> <p>15.4 - 15.9 ft: SANDSTONE; Dark reddish brown (10R3/4), iron-oxide cement, hard, blocky.</p> <p>TOTAL DEPTH = 15.9 FT.</p> <p>Spoon refusal at 15.9'.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>	
SS	2.0	1.7	4 2 3 2				53.3 53.0		1.5 - 4.8 ft: Slag and coal; Pale yellowish brown (10YR6/2), with glass fragments below 4.0', no plasticity.		
SS	2.0	0.9	3 1 1 1				51.3 51.0 50.2 50.1	5			
SS	2.0	2.0	4 6 7 17				49.0 48.4				
SS	2.0	1.7	9 12 18 29				45.3 45.0	10			
SS	2.0	1.7	25 24 25 30				43.3 43.0				
SS	1.0	1.0	27 50/6"								
SS	2.0	2.0	42 36 38 45								
SS	0.9	0.9	32 50/4"				39.6 39.1	15			

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
136 West Central Avenue

Last Update: 03-24-92
HOLE NO. R645



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R646
SITE 136 West Central Avenue			COORDINATES N 10,241.0; E 10,042.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 6-20-91	COMPLETED 6-20-91	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 13.4	ROCK (FT.) 0.6	TOTAL DEPTH 14.0
CORE RECOVERY (FT./%) 10.5/75*		CORE BOXES 0	SAMPLES 7	EL. TOP CASING NA	GROUND EL. 58.0	DEPTH/EL. GROUND WATER NA		DEPTH/EL. TOP OF ROCK 13.4/44.6
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS ON DRYING G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.8	2 3 6				58.0				0.0 - 5.1 ft: FILL . 0.0 - 2.3 ft: Sandy Silt; Dark reddish brown (10R3/4).	Complete borehole number is B3891R646. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging; hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
SS	2.0	1.4	2 3 2				56.2 56.0				2.3 - 5.1 ft: Slag, coal and glass; Dark yellowish brown (10YR4/2) mixed with Very pale orange (10YR8/2) and White (N9).	
SS	2.0	1.1	1 1 6				54.6 54.0					
SS	2.0	1.3	8 5 7				52.9 52.0	5			6.0 - 9.2 ft: Silty CLAY, (CL) ; Light olive gray (5Y5/2), very fine grained, high plasticity, moist.	
SS	2.0	1.8	6 15 17 33				50.7 50.0					
SS	2.0	1.1	10 12 15 42				48.8 48.2 48.0	10			9.2 - 11.1 ft: SILT, (ML) ; Moderate yellowish brown (10YR5/4), very fine grained, sand content <10%, no plasticity, moist.	
SS	2.0	2.0	33 35 36 44				46.9 46.0				12.0 - 13.4 ft: SAND, (SP) ; Dark yellowish brown (10YR4/2), fine to medium grained, well sorted, no plasticity, moist.	
							44.6 44.0				13.4 - 14.0 ft: Silty SAND, (SM) ; Dark reddish brown (10R3/4), fine to medium grained, with weathered sandstone cobbles, no plasticity.	
TOTAL DEPTH = 14.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 136 West Central Avenue	Last Update: 10-08-92	HOLE NO. R646
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
SITE 136 West Central Avenue				COORDINATES N 10236.0; E 10035.0		14501	1 OF 1	R647		
BEGUN 6-20-91	COMPLETED 6-20-91	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 8.0	ROCK (FT.) 0.0	TOTAL DEPTH 8.0	
CORE RECOVERY (FT./%) 1.0/13*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 58.0	DEPTH/EL. GROUND WATER / none ATD / NA		DEPTH/EL. TOP OF ROCK NA/NA		
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook					
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: NYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
									DESCRIPTION AND CLASSIFICATION	
SS	2.0	1.0	2 3 10 11			58.0				Complete borehole number is B3891R647. Borehole sampled by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. No recovery between 2.0 - 8.0'; hole abandoned. Hole backfilled with sand and drilling spoils.
SS	2.0	0.0	5 5 5 4			57.0			0.0 - 1.0 ft: FILL; Sandy Silt; Dark reddish brown (10R3/4), grass, moist.	
SS	2.0	0.0	3 8 7 2				5			
SS	2.0	0.0	6 7 7 11			50.0				
TOTAL DEPTH = 8.0 FT.										
SS = SPLIT SPOON; NQ = CORE BARREL; SITE HX = HAND AUGER; O = OTHER									136 West Central Avenue Last Update: 03-24-92	HOLE NO. R647



GEOLOGIC DRILL LOG

PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R648
SITE 136 West Central Avenue		COORDINATES N 10239.0; E 10035.0		ANGLE FROM HORIZ Vertical
BEGUN 6-20-91	COMPLETED 6-20-91	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"
CORE RECOVERY (FT./%) 2.7/27*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	0.9	2 4 5 9				58.0					
SS	2.0	0.0	2 6 6 7				57.1				0.0 - 0.9 ft: FILL; Sandy silt; Dusky yellowish brown (10YR2/2) changing to Dark reddish brown (10R3/4) at 0.7'.	Complete borehole number is B3891R648.
SS	2.0	0.0	6 4 3 1				5					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.0	1 6 7 23									Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.8	25 27 28 44				50.0				8.0 - 8.7 ft: Silty CLAY, (CL); Dark yellowish brown (10YR4/2) changing to Light olive gray (5Y5/2) at 8.5', fine grained, high plasticity, moist.	No recovery between 2.0 - 8.0' with core catcher in spoons.
							49.3				8.7 - 9.8 ft: Sandy SILT, (ML); Moderate yellowish brown (10YR5/4) changing to Dark reddish brown (10R3/4) at 8.9' and to Moderate brown (5YR4/4) at 9.5', fine to medium grained; very fine to fine grained with clay >10% below 9.5'; no plasticity, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
							48.2					3" PVC casing inserted for gamma-logging.
							48.0	10				PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.
										TOTAL DEPTH = 10.0 FT.		

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R648
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			FUSRAP	14501	1 OF 1	R649
136 West Central Avenue			COORDINATES	N 10231.0; E 10042.0		ANGLE FROM HORIZ
					Vertical	BEARING
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
6-20-91	6-20-91	Hydro Group, Inc.	Tripod	3.5"	10.0	TOTAL DEPTH
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
6.6/66*		0	5	NA	58.0	DEPTH/EL. TOP OF ROCK
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.7	2 5 7 8				58.0				0.0 - 5.0 ft: FILL.	Complete borehole number is B3891R649. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.	
SS	2.0	1.6	1 4 4 2				56.3 56.0				0.0 - 2.6 ft: Sandy Silt; Dark reddish brown (10R3/4) changing to Dusky yellowish brown (10YR2/2) at 2.0', with glass fragments below 2.0'. 2.6 - 5.0 ft: Slag and coal; Pale yellowish brown (10YR6/2) with Grayish orange (10YR7/4) and Black (N1) changing to Light brown (5YR5/6) at 4.8'.		
SS	2.0	1.3	1 2 1 1				54.4 54.0				5.0 - 8.7 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Light olive gray (5Y5/2) at 8.3', very fine grained, silt -60%, sand -40%; no plasticity between 5.0 - 8.3', medium plasticity below; moist.		
SS	2.0	0.0	1 3 6 11				53.0 52.7	5					
SS	2.0	2.0	16 15 17 32				50.0 49.3 48.5 48.2				8.7 - 9.5 ft: Silty SAND, (SM); Moderate brown (5YR4/4), very fine to medium grained, no plasticity, moist.		
							48.0	10			9.5 - 9.8 ft: SILT, (ML); Moderate yellowish brown (10YR5/4), very fine grained, no plasticity, moist. 9.8 - 10.0 ft: SAND, (SP); Moderate brown (5YR4/4), fine to medium grained, well sorted, no plasticity, moist.		
TOTAL DEPTH = 10.0 FT.												Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R649
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GEOLOGIC DRILL LOG

PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R650		
SITE	136 West Central Avenue		COORDINATES		N 10234.0; E 10050.0		ANGLE FROM HORIZ	BEARING	
BEGUN	6-20-91	COMPLETED	6-20-91	DRILLER	Hydro Group, Inc.		DRILL MAKE AND MODEL	SIZE	
CORE RECOVERY (FT./%)		CORE BOXES		SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	ROCK (FT.)	TOTAL DEPTH
7.7/77%		0		5	NA	58.0	7 / none ATD NA / NA	0.0	10.0
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:					
140 lbs/30 in		none		Robert Cook					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME IN MIN.	TIME IN MIN.						
SS	2.0	1.4	3 6 8 7					58.0				0.0 - 5.1 ft: FILL.	Complete borehole number is B3891R650. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging; hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.2	4 1 1 1				56.6					0.0 - 2.5 ft: Sandy Silt; Dark reddish brown (10R3/4), grass.	
SS	2.0	1.2	1 1 1 1				54.8					2.5 - 5.1 ft: Slag, glass and coal; Pale yellowish brown (10YR6/2) with Grayish olive (10Y4/2) and Black (N1), no plasticity.	
SS	2.0	1.2	1 1 1 1				54.0						
SS	2.0	1.9	1 5 6 6				52.9 52.8 52.0	5				5.1 - 7.8 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Light olive gray (5Y5/2), mottled at 7.1'; very fine grained, silt -70%, sand -30%, low plasticity, moist.	
SS	2.0	2.0	6 12 14 22				50.2 50.1 50.0 49.3 48.8 48.6 48.0	10				7.8 - 8.7 ft: SAND, (SP); Moderate brown (5YR4/4), fine to medium grained, well sorted, no plasticity, moist.	
												8.7 - 9.2 ft: SILT, (ML); Pale blue (5PB7/2), mottled; very fine grained, no plasticity, moist.	
												9.2 - 9.4 ft: SAND, (SP); Moderate brown (5YR4/4), fine to coarse grained, well graded, no plasticity, moist.	
												9.4 - 10.0 ft: SILT, (ML); Light brown (5YR5/6), mottled; very fine grained, no plasticity, moist.	
TOTAL DEPTH = 10.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R650
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GEOLOGIC DRILL LOG		PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE		COORDINATES		ANGLE FROM HORIZ	BEARING
136 West Central Avenue		N 10234.0; E 10061.0		Vertical	-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN
6-20-91	6-20-91	Hydro Group, Inc.	Tripod	3.5"	10.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
7.7/77*	0	5	NA	58.0	none ATD
					NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:	
140 lbs/30 in		none		Robert Cook	

SAMP. TYPE	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS G.P.M.	WATER PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.3	6 6 9				58.0			0.0 - 3.7 ft: FILL.	Complete borehole number is B3891R651.
SS	2.0	1.7	6 6 7				56.7 56.0			0.0 - 2.7 ft: Sandy silt, Dusky yellowish brown (10YR2/2) changing to Dark reddish brown (10R3/4) at 0.4', grass. 2.7 - 3.7 ft: Slag, glass and coal.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	5 5 3 4				54.3 54.0			4.0 - 5.5 ft: Clayey SILT, (ML); Black (N1) changing to Dusky yellowish brown (10YR2/2) at 4.8', fine grained, silt - 60%, clay - 30%, sand - 10%, low plasticity, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.4	4 4 4 4				52.5 52.0 51.3 50.6			6.0 - 6.7 ft: Silty CLAY, (CL); Brownish gray (5YR4/1), mottled; very fine grained, low plasticity, moist. 6.7 - 8.7 ft: Clayey SILT, (ML); Moderate yellowish brown (10YR5/4), very fine grained, silt - 70%, clay - 30%, low plasticity, moist.	
SS	2.0	1.8	20 24 18 26				50.0 49.3 48.9 48.2 48.0			8.7 - 9.1 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), weathered sandstone. 9.1 - 9.8 ft: SILT, (ML); Moderate yellowish brown (10YR5/4), very fine grained, no plasticity, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging; hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
										TOTAL DEPTH = 10.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R651
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R652
SITE 136 West Central Avenue			COORDINATES N 10236.0; E 10079.0			ANGLE FROM HORIZON BEARING Vertical		
BEGUN 6-20-91	COMPLETED 6-20-91	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 2.4	TOTAL DEPTH 8.4
CORE RECOVERY (FT./%) 5.5/65*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 58.0	DEPTH/EL. GROUND WATER none ATD		DEPTH/EL. TOP OF ROCK 6.0/52
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	14					58.0				0.0 - 2.6 ft: FILL; Sandy Silt, Dark reddish brown (10R3/4).	Complete borehole number is B3891R652. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Spoon refusal at 8.4'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.
SS	2.0	1.1	9					56.7				2.6 - 5.0 ft: Sandy SILT, (ML); Dusky brown (5YR2/2) changing to Moderate yellowish brown (10YR5/4) at 4.0', fine to medium grained, silt -70%, sand -30%, low plasticity, moist.	
SS	2.0	1.0	5					56.0					
			3					55.4					
			6					54.9					
								54.0	5				
SS	2.0	1.8	8					53.0				6.0 - 8.3 ft: SANDSTONE interlayered with SAND, (SW); sandstone is Dark reddish brown (10YR3/4), iron-oxide cement, blocky; sand is Moderate brown (5YR3/4), medium to coarse grained, well sorted, no plasticity, moist.	
SS	0.4	0.3	50/4*					52.0					
								50.2					
								50.0					
								49.7					
								49.6					
TOTAL DEPTH = 8.4 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE 136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R652
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R653
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
136 West Central Avenue			N 10251.0; E 10050.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
6-21-91	6-21-91	Hydro Group, Inc.	Hand Auger		3"	3.5	0.0	3.5		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.0/86°		0	7	NA	52.0	V / none ATD NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
NA		none			Robert Cook					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOMS RECOVERY	LOSS IN G.P.M	WATER PRESS. P.S.F.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
O	0.5	0.0	NA				52.0			(Template: MYWD)	
HX	0.5	0.5	NA				51.5			0.0 - 0.5 ft: CONCRETE.	Complete borehole number is B3891R653. Borehole sampled and gamma-logged by TMA/Eberline Corp. Concrete cut to 0.5' Hole advanced to depth by hand auger. Gamma-logging completed in open hole. Hole was backfilled with sand and concrete.
HX	0.5	0.5	NA				51.0			0.5 - 1.0 ft: FILL; brick and concrete fragments.	
HX	0.5	0.5	NA							1.0 - 3.5 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Light olive gray (5Y5/2) at 2.3' and to Moderate yellowish brown (10YR5/4) at 2.8', silt -70%, moist.	
HX	0.5	0.5	NA								
HX	0.5	0.5	NA								
HX	0.5	0.5	NA								
HX	0.5	0.5	NA				48.5			TOTAL DEPTH = 3.5 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R653
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GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: R654

SITE: 136 West Central Avenue
 COORDINATES: N 10254.0; E 10055.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 6-21-91
 COMPLETED: 6-21-91
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Hand Auger
 SIZE: 3"
 OVERBURDEN: 2.0
 ROCK (FT.): 0.0
 TOTAL DEPTH: 2.0

CORE RECOVERY (FT./%): 1.5/75%
 CORE BOXES: 0
 SAMPLES: 4
 EL. TOP CASING: NA
 GROUND EL.: 52.0
 DEPTH/EL. GROUND WATER: none ATD
 DEPTH/EL. TOP OF ROCK: NA/NA

SAMPLE HAMMER WEIGHT/FALL: NA
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Robert Cook

SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
O	0.5	0.0	NA				52.0					
HX	0.5	0.5	NA				51.5				0.0 - 0.5 ft: CONCRETE.	Complete borehole number is B3891R654. Borehole sampled and gamma-logged by TMA/Eberline Corp. Concrete cut to 0.5' Hole advanced to depth by hand auger. Gamma-logging completed in open hole. Hole was backfilled with sand and concrete.
HX	0.5	0.5	NA				51.0				0.5 - 1.0 ft: FILL; Clayey Silt, Dusky yellowish brown (10YR2/2), mixed with concrete fragments.	
HX	0.5	0.5	NA				50.0				1.0 - 2.0 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Light olive gray (5Y5/2) at 1.7' moist.	
											TOTAL DEPTH = 2.0 FT.	

(Template: MYWD)

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948); colors were determined in house basement under fluorescent lighting.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: 136 West Central Avenue

Last Update: 03-24-92

HOLE NO.: R654



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R655				
136 West Central Avenue				N 10268.0; E 10050.0		ANGLE FROM HORIZ		BEARING				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
6-21-91	6-21-91	Hydro Group, Inc.	Hand Auger		3"	2.0	0.0	2.0				
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
1.5/75*	0	4	NA	52.0	/ none ATD / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
NA		none			Robert Cook <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
O	0.5	0.0	NA				52.0					
HX	0.5	0.5	NA				51.5			0.0 - 0.5 ft: CONCRETE.	Complete borehole number is B3891R655.	
HX	0.5	0.5	NA							0.5 - 2.0 ft: Clayey SILT, (ML); Olive gray (5Y4/1) changing to Pale yellowish brown (10YR6/2) at 1.0', and to Pale brown (5YR5/2) at 1.5'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
HX	0.5	0.5	NA				50.0			TOTAL DEPTH = 2.0 FT.	Concrete cut to 0.5' Hole advanced to depth by hand auger. Gamma-logging completed in open hole. Hole was backfilled with sand and concrete.	
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948); colors were determined in house basement under fluorescent lighting.</p>												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			136 West Central Avenue			Last Update: 03-24-92		HOLE NO. R655	



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			FUSRAP		14501	1 OF 1 R656
136 West Central Avenue			COORDINATES		ANGLE FROM HORIZ BEARING	
			N 10223.0; E 10050.0		Vertical -----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
6-24-91	6-24-91	Hydro Group, Inc.	Tripod	3.5"	10.0	0.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
7.6/76*	0	5	NA	58.0	NA / none ATD	NA/NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	WATER TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.6	3	11			58.0				0.0 - 4.9 ft: FILL.	Complete borehole number is B3891R656.	
			20				56.4				0.0 - 3.3 ft: Sandy Silt; Dark reddish brown (10R3/4), grass.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.8	6	5			56.0				3.3 - 4.9 ft: Slag, glass and coal; Pale yellowish brown (10YR6/2) with Grayish orange (10YR7/4) and Light brown (5YR5/8), moist.	Hole advanced to depth by 3" OD split spoon samplers.	
SS	2.0	1.2	3	2			54.2				4.9 - 8.7 ft: Clayey to Sandy SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Light olive gray (5Y5/2) at 6.7' and to Moderate yellowish brown (10YR5/4) at 7.1', fine grained, silt -60-70%; clay -30%, contents decreasing to -10% with depth; sand <10%, contents increasing to -30% with depth; medium to low plasticity, moist.		
			2				54.0						
			2				53.1						
			1				52.8						
SS	2.0	1.4	1	2			52.0				8.7 - 9.6 ft: SILT, (ML); Moderate yellowish brown (10YR5/4) mottled with Light bluish gray (6B7/1), very fine grained, no plasticity, moist.		
			2				50.6						
			2				50.0						
SS	2.0	1.6	6	11			49.3						
			14				48.4						
			21				48.0						
TOTAL DEPTH = 10.0 FT.												Borehole enlarged by driving 3.5" OD split spoon to depth.	
												3" PVC casing inserted for gamma-logging.	
												PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R656
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R657

SITE

136 West Central Avenue

COORDINATES

N 10226.0; E 10064.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

6-24-91

COMPLETED

6-24-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

10.0

ROCK (FT.)

0.0

TOTAL DEPTH

10.0

CORE RECOVERY (FT./%)

5.9/59*

CORE BOXES

0

SAMPLES

5

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

NA / none ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.6	2897				58.0				0.0 - 4.7 ft: FILL. 0.0 - 2.7 ft: Sandy Silt; Dark reddish brown (10R3/4), moist.	Complete borehole number is B3891R657. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. No recovery between 6.0 - 8.0' (-0.2' glass and slag slough).
SS	2.0	1.1	3332			56.4 56.0				2.7 - 4.7 ft: Slag, ash, glass and clay.		
SS	2.0	1.6	1214			54.0 53.3	5			4.7 - 5.6 ft: Clayey SILT, (ML); Moderate brown (5YR3/4), fine grained, silt -80%, sand -20%, low plasticity, moist.		
SS	2.0	0.0	3348			52.4						
SS	2.0	1.6	8925			50.0 49.6				8.0 - 8.4 ft: Sandy SILT, (ML); Moderate yellowish brown (10YR5/4), fine to medium grained, silt -70%, sand -30%, no plasticity, moist.		
						48.4 48.0	10				8.4 - 9.6 ft: SILT, (ML); Light brown (5YR5/6), mottled with Light olive gray (5Y5/2) below 9.4'; very fine grained, no plasticity, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.
TOTAL DEPTH = 10.0 FT.												

(Template: MYLD)

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

136 West Central Avenue

Last Update: 03-24-92

HOLE NO.

R657



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R658

SITE

136 West Central Avenue

COORDINATES

N 10252.0; E 10035.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

6-24-91

COMPLETED

6-24-91

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

10.0

ROCK (FT.)

0.0

TOTAL DEPTH

10.0

CORE RECOVERY (FT./%)

4.0/40*

CORE BOXES

0

SAMPLES

5

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

none ATD
NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS	% CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TEMP. MIN.	TIME MIN.						
SS	2.0	0.8	2	2					58.0				0.0 - 4.1 ft: FILL.	Complete borehole number is B3891R658. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. No recovery between 2.0 - 4.0'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with sand and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
									57.2				0.0 - 0.8 ft: Sandy Silt; Dark reddish brown (10R3/4), moist.	
SS	2.0	0.0	2	2					54.0					
									53.9				4.0 - 4.1 ft: Slag and Clay; Dusky yellowish brown (10YR2/2).	
SS	2.0	0.1	2	2					52.0					
									51.4				6.0 - 6.6 ft: Clayey SILT, (ML); Dark yellowish brown (10YR4/2), very fine grained, silt -60%, clay -40%; cobble between 6.4 - 6.6'; medium plasticity, moist.	
									50.8					
SS	2.0	1.2	4	9					50.0				6.6 - 9.0 ft: Silty SAND, (SM); Moderate brown (5YR4/4) changing to Dark reddish brown (10R3/4) at 8.8', fine to medium grained, no plasticity, moist.	
									49.0				9.0 - 9.9 ft: SILT, (ML); Moderate brown (5YR4/4), very fine grained, no plasticity, moist.	
									48.1					
									48.0	10			TOTAL DEPTH = 10.0 FT.	

SS = SPLIT SPOON; NO = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

136 West Central Avenue

Last Update: 03-24-92

HOLE NO. R658



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R659
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
136 West Central Avenue			N 10271.0; E 10043.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
6-24-91	6-24-91	Hydro Group, Inc.	Tripod		3.5"	9.3	0.7	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.8/58*		0	5	NA	58.0	NA		9.3/48.7		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP. TYPE	SAMP. DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
									58.0				(Template: NYWD)	
SS	1.5	0.7		8					57.5				0.0 - 1.0 ft: ASPHALT; over gravel.	Complete borehole number is B3891R659.
				6					57.0				1.0 - 4.5 ft: FILL.	Asphalt cut to 0.5'.
				4					56.8				1.0 - 2.2 ft: Sandy Silt; Dark reddish brown (10RS/4), moist.	
SS	2.0	1.2		4					56.0				2.2 - 3.2 ft: Slag, glass and coal; Pale yellowish brown (10YR6/2) with Light brown (5YR5/6) and Black (N1), moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
				5					54.8				4.0 - 4.5 ft: Sludge; White (N9), silty texture, moist.	
				2					54.0				4.5 - 6.4 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2), very fine grained, medium plasticity, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	0.7		5					53.5				6.4 - 8.8 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), fine to medium grained, well sorted, no plasticity, moist.	
				2					53.3				8.8 - 9.3 ft: SILT, (ML); Light brown (5YR5/6), mottled; striated -1/4" thick, very fine grained, hard, moist.	
				3					52.0				9.3 - 9.5 ft: SANDSTONE; Dark reddish brown (10R3/4), blocky.	Borehole enlarged by driving 3.5" OD split spoon to depth.
SS	2.0	1.7		5					51.6				TOTAL DEPTH = 10.0 FT.	3" PVC casing inserted for gamma-logging.
				6					50.3					PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.
				7					50.0					
				15					49.2					
SS	2.0	1.5		15					48.7					
				18					48.5					
				20					48.0					
				34										

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	136 West Central Avenue	Last Update: 03-24-92	HOLE NO. R659
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GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R660**

SITE **136 West Central Avenue** COORDINATES **N 10289.0; E 10053.0** ANGLE FROM HORIZ **Vertical** BEARING **-----**

BEGUN **6-25-91** COMPLETED **6-25-91** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Tripod** SIZE **3.5"** OVERBURDEN **8.8** ROCK (FT.) **0.2** TOTAL DEPTH **9.0**

CORE RECOVERY (FT./%) **4.7/52*** CORE BOXES **0** SAMPLES **5** EL. TOP CASING **NA** GROUND EL. **60.0** DEPTH/EL. GROUND WATER **7 / none ATD** DEPTH/EL. TOP OF ROCK **8.8/51.2**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.6	4 12 17 32				60.0				0.0 - 4.5 ft: FILL. 0.0 - 4.4 ft: Sandy Silt; Dusky brown (5YR2/2) changing to Dark reddish brown (10R3/4) at 0.7', moist.	<p>Complete borehole number is B3891R660.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Spoon refusal at 9.0'.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>
SS	2.0	0.1	11 10 7 6				58.4 58.0 57.9				4.4 - 4.5 ft: Sludge; White (N9), -1/2" thick, silty texture, moist.	
SS	2.0	0.7	7 6 6 5				56.0 55.5 55.3	5			4.5 - 6.7 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), Dusky yellowish brown (10YR2/2) between 4.6 - 4.7'; very fine grains up to cobbles.	
SS	2.0	1.3	10 12 20 23				54.0 53.3 52.7				6.7 - 8.5 ft: Silty SAND, (SM); Moderate brown (5YR4/4) changing to Grayish brown (5YR3/2) at 8.0', fine to medium grained, silt -30%, no plasticity, moist.	
SS	1.0	1.0	21 50/6"				52.0 51.5 51.2 51.0				8.5 - 8.8 ft: Clayey SILT, (ML); Moderate brown (5YR4/4), very fine to fine grained, low plasticity, moist. 8.8 - 9.0 ft: SANDSTONE; Dark reddish brown (10R3/4), blocky.	
TOTAL DEPTH = 9.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE **136 West Central Avenue**

Last Update: **03-24-92** HOLE NO. **R660**



GEOLOGIC DRILL LOG										PROJECT			JOB NO.		SHEET NO.		HOLE NO.	
SITE 136 West Central Avenue										COORDINATES N 10297.0; E 10071.0			14501		1 OF 1		R661	
BEGUN 6-25-91		COMPLETED 6-25-91		DRILLER Hydro Group, Inc.			DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 5.0	ANGLE FROM HORIZ Vertical		BEARING -----					
CORE RECOVERY (FT./%) 4.1/59*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA		GROUND EL. 60.0		DEPTH/EL. GROUND WATER / none ATD / NA		ROCK (FT.) 2.0		TOTAL DEPTH 7.0						
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook												
(Template: NYWD)																		
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOMS	% CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.					
SS	2.0	1.9	6 13 24 40				60.0				0.0 - 2.1 ft: FILL; Sandy Silt; Dusky yellowish brown (10YR2/2) changing to Dark reddish brown (10R3/4) at 0.9', sandstone cobble between 2.0 - 2.1'.		Complete borehole number is B3891R661.					
SS	2.0	0.1	13 15 10 5				58.1 58.0 57.9				4.0 - 5.0 ft: Sandy SILT, (ML); Moderate brown (5YR4/4), very fine to fine grained, no plasticity, moist.		Borehole sampled and gamma-logged by TMA/Eberline Corp.					
SS	2.0	1.1	3 3 3 3				56.0 55.0 54.9	5			5.0 - 7.0 ft: SANDSTONE and Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, no plasticity, blocky, brittle, iron-oxide cement, weathered.		Hole advanced to depth by 3" OD split spoon samplers.					
SS	1.0	1.0	14 50/6"				54.0 53.0				TOTAL DEPTH = 7.0 FT.		Spoon refusal at 7.0'.					
													Borehole enlarged by driving 3.5" OD split spoon to depth.					
													3" PVC casing inserted for gamma-logging.					
													PVC casing was removed after logging and hole was backfilled with sand and drilling spoils.					
													* Core recovery refers to total soil & rock sample.					
													Ground elevation estimated from site topographic map.					
													Description & classification by visual examination of sample.					
													Colors from "Rock-Color Chart" (GSA, 1948).					
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER										SITE 136 West Central Avenue		Last Update: 03-24-92		HOLE NO. R661				

APPENDIX F

**Radiological Data, Geologic Logs,
and Chemical Data for Commercial/Governmental
Vicinity Properties**

Contents

RADIOLOGICAL DATA

Table		Page
F-1	Surface and Subsurface Radionuclide Concentrations in Soil, 200 State Route 17	F-1
F-2	Downhole Gamma Logging Results, 200 State Route 17	F-7
F-3	Gamma Radiation Exposure Rates, 200 State Route 17	F-21
F-4	Surface and Subsurface Radionuclide Concentrations in Soil, Essex Street and State Route 17	F-22
F-5	Downhole Gamma Logging Results, Essex Street and State Route 17	F-26
F-6	Gamma Radiation Exposure Rates, Essex Street and State Route 17	F-35
F-7	Surface and Subsurface Radionuclide Concentrations in Soil, 113 Essex Street	F-36
F-8	Downhole Gamma Logging Results, 113 Essex Street	F-40
F-9	Gamma Radiation Exposure Rates, 113 Essex Street	F-56
F-10	Surface and Subsurface Radionuclide Concentrations in Soil, Interstate 80 (Westbound Right-of-Way)	F-57
F-11	Downhole Gamma Logging Results, Interstate 80 (Westbound Right-of-Way)	F-61
F-12	Gamma Radiation Exposure Rates, Interstate 80 (Westbound Right-of-Way)	F-76
F-13	Surface and Subsurface Radionuclide Concentrations in Soil, 205 Maywood Avenue	F-77
F-14	Downhole Gamma Logging Results, 205 Maywood Avenue	F-82
F-15	Gamma Radiation Exposure Rates, 205 Maywood Avenue	F-98

CHEMICAL DATA

Table		Page
F-16	Metals and Rare Earths, Commercial/Governmental Vicinity Properties, Soil Samples	F-99
F-17	Volatile Organic Compounds, Commercial/Governmental Vicinity Properties, Soil Samples	F-103
F-18	BNAEs, Commercial/Governmental Vicinity Properties, Soil Samples	F-104
F-19	PCBs, Commercial/Governmental Vicinity Properties, Soil Samples	F-106
F-20	Pesticides/PCBs, Commercial/Governmental Vicinity Properties, Soil Samples	F-109
F-21	Total Petroleum Hydrocarbons, Commercial/Governmental Vicinity Properties, Soil Samples	F-111
F-22	TCLP Metals, Commercial/Governmental Vicinity Properties, Soil Samples	F-112
F-23	TCLP Volatile Organic Compounds, Commercial/Governmental Vicinity Properties, Soil Samples	F-116
F-24	TCLP BNAEs, Commercial/Governmental Vicinity Properties, Soil Samples	F-117
F-25	TCLP Pesticides, Commercial/Governmental Vicinity Properties, Soil Samples	F-118
F-26	Corrosivity/Reactivity, Commercial/Governmental Vicinity Properties, Soil Samples	F-119
F-27	Mobile Ions, Commercial/Governmental Vicinity Properties, Soil Samples	F-123

GEOLOGIC LOGS

Property	Page
200 Route 17 (Sears)	F-127
Essex Street and Route 17 (Muscarelle)	F-166
113 Essex Street (National Community Bank)	F-187
Interstate 80 (Westbound Right-of-Way)	F-225
205 Maywood Avenue (Myron)	F-253

Radiological Data

Table F-1
 Surface and Subsurface Radionuclide Concentrations in Soil,
 200 Route 17

Page 1 of 6

<u>Coordinates</u>		Borehole No.	Depth (ft)	<u>Concentration (pCi/g ± 2 sigma)</u>		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
10550	8200		0.0 - 0.5	< 3.7	.4 ± 0.3	< .4
10550	8250		0.0 - 0.5	< 7	.9 ± 0.4	1.5 ± 0.6
10600	8250		0.0 - 0.5	< 4.5	.4 ± 0.3	
10700	8000		0.0 - 0.5	< 3.6	.6 ± 0.3	1.4 ± 0.3
10700	8310		0.0 - 0.5	< 1.8	.6 ± 0.3	.4 ± 0.4
10730	8300		0.0 - 0.5	< 3.5	< .7	< 1.2
10740	8260		0.0 - 0.5	< 3.1	< .7	< 1
10750	8200		0.0 - 0.5	< 3.2	.3 ± 0.2	.6 ± 0.2
10790	8150		0.0 - 0.5	< 2.6	.7 ± 0.2	.7 ± 0.3
10790	8210		0.0 - 0.5	< 4.6	.4 ± 0.2	.5 ± 0.2
10800	8000		0.0 - 0.5	< 5.3	.7 ± 0.4	.7 ± 0.4
10800	8200		0.0 - 0.5	< 2.7	< .4	.8 ± 0.4
10800	8246		0.0 - 0.5	< 3.9	.8 ± 0.3	1.4 ± 0.5
10810	8240		0.0 - 0.5	< 2.1	< .6	< .8
10820	8230		0.0 - 0.5	< 2.4	< .5	< .9
10847	8050		0.0 - 0.5	< 3.1	.6 ± 0.3	.5 ± 0.4
10870	8135		0.0 - 0.5	< 7.5	1.4 ± 0.5	5.4 ± 0.5
10870	8180		0.0 - 0.5	< 4.0	1.0 ± 0.3	4.0 ± 0.7
10880	8160		0.0 - 0.5	< 4.3	< .6	3.4 ± 0.1
10880	8170		0.0 - 0.5	< 4.2	2.2 ± 0.6	5.4 ± 0.7
					< .7	3.8 ± 1.8

Table F-1
(continued)

Page 2 of 6

<u>Coordinates</u>		<u>Borehole No.</u>	<u>Depth (ft)</u>	<u>Concentration (pCi/g \pm 2 sigma)</u>		
<u>East</u>	<u>North</u>			<u>Uranium-238</u>	<u>Radium-226</u>	<u>Thorium-232</u>
10900	8140		0.0 - 0.5	< 3.6	1.1 \pm 0.4	5 \pm 1.0
10900	8160		0.0 - 0.5	< 9.3	5.6 \pm 0.9	59.4 \pm 4.9
10900	8170		0.0 - 0.5	< 9.1	2.2 \pm 0.3	18.7 \pm 1.9
10920	8120		0.0 - 0.5	< 3.1	.8 \pm 0.3	3.3 \pm 1.0
10920	8140		0.0 - 0.5	< 6.0	< .8	8 \pm 1.4
10920	8150		0.0 - 0.5	< 4.8	1.3 \pm 0.3	6.4 \pm 1.2
10940	8100		0.0 - 0.5	< 2.4	< .6	< .9
10940	8120		0.0 - 0.5	< 7.7	2.2 \pm 0.7	12.7 \pm 0.7
10940	8140		0.0 - 0.5	< 3.2	.6 \pm 0.3	1.2 \pm 0.4
10960	8080		0.0 - 0.5	< 2.7	.7 \pm 0.3	< 1.0
10960	8100		0.0 - 0.5	< 3.3	< .6	1.5 \pm 0.1
10960	8120		0.0 - 0.5	< 2.4	< .6	< .8
10980	8080		0.0 - 0.5	< 3.9	< .8	< 1.4
10980	8100		0.0 - 0.5	< 3.1	< .5	1.2 \pm 0.3
11000	8090		0.0 - 0.5	< 2.4	< .6	< .8
Subsurface						
10549	8252	B3890R544	0.0 - 1.0	< 7.8	.8 \pm 0.2	1.5 \pm 0.3
			3.0 - 4.0	6.8 \pm 5.5	2.6 \pm 0.6	9.6 \pm 2.8
			7.0 - 8.0	< 1.6	.4 \pm 0.3	< .5
			8.0 - 9.0	< 2.3	< .6	< .9
			9.0 - 10.0	< 2.2	< .5	< .8
10590	8150	B3890R552	0.0 - 1.0	< 1.6	.6 \pm 0.4	.7 \pm 0.5
			2.0 - 3.0	< 2.2	.7 \pm 0.1	.6 \pm 0.3
			5.0 - 6.0	< 2.6	.7 \pm 0.1	.8 \pm 0.4
			6.0 - 7.0	1.6 \pm 1.6	.6 \pm 0.5	.4 \pm 0.4
			7.0 - 8.0	< 2.4	.4 \pm 0.2	.4 \pm 0.3

Table F-1
(continued)

Page 3 of 6

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
10650	8050	B3890R551	0.0 - 1.0	< 2	.7 \pm 0.5	.7 \pm 0.4
			3.0 - 4.0	< 1.8	.9 \pm 0.4	.5 \pm 0.5
			6.0 - 7.0	< 4.5	.6 \pm 0.2	.8 \pm 0.3
			7.0 - 8.0	< 3.9	.6 \pm 0.3	.3 \pm 0.3
10650	8303	B3890R545	0.0 - 1.0	< 2.3	< .6	< .7
			3.0 - 4.0	< 4.2	1.4 \pm 0.4	< 1.3
			7.0 - 8.0	< 2	.7 \pm 0.1	.7 \pm 0.6
10680	8330	B3890R569	0.0 - 1.0	3.1 \pm 3.1	1 \pm 0.4	1.2 \pm 0.4
			4.0 - 5.0	< 2.5	.8 \pm 0.4	1.1 \pm 0.4
			7.0 - 8.0	< 2.4	.8 \pm 0.2	.9 \pm 0.3
10738	8290	B3890R568	0.0 - 1.0	< 2.2	.5 \pm 0.1	.5 \pm 0.3
			5.0 - 6.0	< 2.5	.8 \pm 0.3	.9 \pm 0.4
			7.0 - 8.0	< 1.3	.6 \pm 0.1	1.1 \pm 0.3
10749	8052	B3890R546	0.0 - 1.0	< 3.2	< .7	1.9 \pm 0.8
			2.0 - 3.0	< 2.5	< .7	< .7
			4.0 - 5.0	< 2.2	< .6	< .7
			5.0 - 6.0	< 2.4	.6 \pm 0.2	< .8
10750	7950	B3890R550	0.0 - 1.0	2.4 \pm 2.2	.8 \pm 0.3	.7 \pm 0.5
			3.0 - 4.0	6.2 \pm 4.0	.9 \pm 0.6	< .9
			6.0 - 7.0	< 2.4	.5 \pm 0.2	.6 \pm 0.3
			7.0 - 8.0	< 2.3	.5 \pm 0.2	.7 \pm 0.4
10750	8250	B3890R543	0.0 - 1.0	< 2.5	< .6	< .9
			4.0 - 5.0	< 5.2	.5 \pm 0.1	1 \pm 0.4
			7.0 - 8.0	< 1.7	< .4	< .7
10760	8262	B3890R626	0.0 - 2.0	< 2.1	.5 \pm 0.2	.5 \pm 0.4
			4.0 - 5.0	< 2.9	.9 \pm 0.4	1.1 \pm 0.4
			7.0 - 8.0	< 4.7	.9 \pm 0.3	.8 \pm 0.4
10793	8250	B3890R567	0.0 - 2.0	< 1.7	.3 \pm 0.2	< .3
			5.0 - 6.0	< 4.9	.7 \pm 0.1	1.1 \pm 0.4
			7.0 - 8.0	2.1 \pm 1.8	.5 \pm 0.1	.7 \pm 0.4
10805	8145	B3890R540	0.0 - 1.0	< 6.6	.6 \pm 0.3	1 \pm 0.5
			5.0 - 6.0	< 3.3	.7 \pm 0.3	.9 \pm 0.4
			6.0 - 7.0	< 3.4	.4 \pm 0.4	< .5
			7.0 - 8.0	< 4.2	< .4	1.2 \pm 0.5

Table F-1
(continued)

Page 4 of 6

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
10820	8205	B3890R571	0.0 - 1.0	< 3.1	.7 \pm 0.2	.6 \pm 0.3
			2.0 - 3.0	< 4	.9 \pm 0.3	.6 \pm 0.3
			7.0 - 8.0	< 2.2	.6 \pm 0.2	.7 \pm 0.3
10830	8175	B3890R557	0.0 - 2.0	< 4.2	.9 \pm 0.3	1.3 \pm 0.2
			4.0 - 5.0	< 1.4	.5 \pm 0.3	.8 \pm 0.1
			5.0 - 6.0	< 2.3	.7 \pm 0.2	.7 \pm 0.3
10830	8215	B3890R555	0.0 - 1.0	< 1.4	.7 \pm 0.2	
			2.0 - 3.0	2.9 \pm 1.1	.7 \pm 0.4	
			3.0 - 4.0	< 1.9	.5 \pm 0.2	.5 \pm 0.2
			4.0 - 5.0	< 6.3	.5 \pm 0.4	.7 \pm 0.5
			5.0 - 6.0	< 3.2	.4 \pm 0.2	1 \pm 0.4
			6.0 - 7.0	< 1.8	.6 \pm 0.3	.6 \pm 0.3
			7.0 - 8.0	< 7.3	.6 \pm 0.4	.9 \pm 0.6
10848	8175	B3890R556	0.0 - 1.0	< 2.2	.8 \pm 0.3	2.4 \pm 0.2
			1.0 - 2.0	< 12	4.3 \pm 0.7	34 \pm 5
			2.0 - 3.0	< 1.9	.8 \pm 0.3	.8 \pm 0.3
			3.0 - 4.0	< 3.5	1.4 \pm 0.4	6.4 \pm 0.7
			4.0 - 5.0	< 2.1	.5 \pm 0.2	.7 \pm 0.2
			5.0 - 6.0	< 4.1	.5 \pm 0.2	.7 \pm 0.2
			6.0 - 7.0	< 1.8	.5 \pm 0.2	.9 \pm 0.5
			7.0 - 8.0	< 2.5	.6 \pm 0.2	.5 \pm 0.3
10850	8100	B3890R541	0.0 - 1.0	< 5.4	< 1.2	3.1 \pm 1.0
			4.0 - 5.0	< 2.6	< .6	< .8
			5.0 - 6.0	< 2.9	< .7	< .8
10850	8150	B3890R539	0.0 - 1.0	< 1.3	.3 \pm 0.3	.8 \pm 0.4
			5.0 - 6.0	< 4.2	.8 \pm 0.3	.5 \pm 0.4
			6.0 - 7.0	< 3.2	.5 \pm 0.3	.8 \pm 0.5
			7.0 - 8.0	< 3.4	.8 \pm 0.4	.4 \pm 0.3
10850	8200	B3890R538	0.0 - 1.0	< 3.3	.8 \pm 0.3	.8 \pm 0.5
			1.0 - 2.0	< 1.9	1.3 \pm 0.4	6.9 \pm 0.7
			2.0 - 3.0	< 5.1	1.2 \pm 0.5	2.3 \pm 0.6
			4.0 - 5.0	< 2	.5	.6 \pm 0.5
			5.0 - 6.0	3.9 \pm 3.6	.6 \pm 0.4	.9 \pm 0.7
			6.0 - 7.0	< 1.9	.5 \pm 0.2	.7 \pm 0.3
			7.0 - 8.0	< 3.4	.4 \pm 0.3	1 \pm 0.6

Table F-1
(continued)

Page 5 of 6

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
10870	8135	B3890R558	0.0 - 2.0	< 3.3	< .3	.9 \pm 0.2
			4.0 - 5.0	< 1.8	.4 \pm 0.3	.8 \pm 0.2
			5.0 - 6.0	< 2.3	.6 \pm 0.3	.7 \pm 0.2
			6.0 - 7.0	< 1.6	.4 \pm 0.2	.4 \pm 0.3
			7.0 - 8.0	< 2.3	.8 \pm 0.2	.5 \pm 0.2
10871	8187	B3890R554	0.0 - 1.0	< 2.5	1 \pm 0.3	3 \pm 0.5
			1.0 - 2.0	3.3 \pm 3.3	1.5 \pm 0.4	4.2 \pm 0.7
			3.0 - 4.0	< 10	1.5 \pm 0.5	5.2 \pm 1.0
			7.0 - 8.0	< 5.7	.3 \pm 0.3	.8 \pm 0.5
10890	8100	B3890R561	0.0 - 1.0	< 4.1	1 \pm 0.3	1.4 \pm 0.7
			3.0 - 4.0	< 2.5	.6 \pm 0.3	.8 \pm 0.2
			5.0 - 6.0	< 4.8	< .9	< 1.4
10890	8125	B3890R560	0.0 - 1.0	< 3.5	< .7	< 1.2
			4.0 - 5.0	< 2.5	< .5	.7 \pm 0.5
			5.0 - 6.0	< 2.6	< .6	< .7
			6.0 - 8.0	< 4.4	< .7	< 1
10900	8050	B3890R547	0.0 - 1.0	< 3.2	.8 \pm 0.3	1.2 \pm 0.5
			3.0 - 4.0	< 2.3	.5 \pm 0.3	< .5
			6.0 - 7.0	< 1.6	1 \pm 0.4	.8 \pm 0.5
			7.0 - 8.0	< 3.4	.9 \pm 0.5	.8 \pm 0.5
10900	8075	B3890R564	0.0 - 1.0	< 6.6	.8 \pm 0.2	1.5 \pm 0.3
			3.0 - 4.0	< 2.6	.7 \pm 0.3	< .9
			6.0 - 7.0	< 2.6	< .7	< .8
			7.0 - 8.0	< 6.3	.7 \pm 0.2	1.1 \pm 0.3
10900	8100	B3890R542	0.0 - 1.0	< 2.5	.7 \pm 0.2	1.3 \pm 0.3
			1.0 - 2.0	< 2.1	< .7	3.3 \pm 0.8
			2.0 - 3.0	< 4	.9 \pm 0.3	2 \pm 0.6
			3.0 - 4.0	< 9.4	3.9 \pm 0.8	48 \pm 2
			5.0 - 6.0	< 1.9	.7 \pm 0.3	.9 \pm 0.4
10900	8125	B3890R559	0.0 - 1.0	< 8.2	2.9 \pm 0.8	15.6 \pm 5.9
			2.0 - 3.0	< 7.8	1.9 \pm 0.5	21.7 \pm 5.4
			3.0 - 4.0	< 2.1	< .5	1.1 \pm 0.4
			6.0 - 7.0	< 9.3	.7 \pm 0.3	5.8 \pm 0.9
			7.0 - 8.0	< 6.7	.6 \pm 0.2	2.2 \pm 0.2

Table F-1
(continued)

Page 6 of 6

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
10905	8173	B3890R553	0.0 - 1.0	< 2.4	1.2 \pm 0.4	3.7 \pm 0.9
			1.0 - 2.0	< 4	1.8 \pm 0.4	3.4 \pm 0.5
			2.0 - 3.0	6.1 \pm 3.1	2.1 \pm 0.5	6.1 \pm 0.8
			3.0 - 4.0	2 \pm 1.7 <	.4	1.1 \pm 0.4
			8.0 - 9.0	< 5.4	1 \pm 0.4	.5 \pm 0.5
			9.0 - 10.0	< 5.5	.4 \pm 0.3	< .4
10910	8100	B3890R562	0.0 - 1.0	< 2.8	< .6	.9 \pm 0.4
			5.0 - 6.0	< 4	.8 \pm 0.4	< 1
			6.0 - 8.0	< 4	.8 \pm 0.3	< 1
10910	8125	B3890R563	0.0 - 1.0	< 5.2	1.2 \pm 0.4	< 1.5
			4.0 - 5.0	< 2.6	< .5	.7 \pm 0.4
			5.0 - 6.0	< 2.5	< .6	< .7
10910	8050	B3890R566	0.0 - 1.0	< 2.4	< .7	< .8
			2.0 - 3.0	< 3.2	< .7	< 1.1
			4.0 - 5.0	< 2.3	< .6	< .9
10915	8065	B3890R549	0.0 - 1.0	< 1.8	.4 \pm 0.3	.7 \pm 0.4
			2.0 - 3.0	< 4.7	1.3 \pm 0.5	3.5 \pm 0.7
			3.0 - 4.0	5.9 \pm 4.9	1.4 \pm 0.5	2.8 \pm 0.8
			4.0 - 5.0	< 9.1	.8 \pm 0.5	1.7 \pm 0.8
			6.0 - 7.0	< 2.6	.5 \pm 0.3	1.9 \pm 0.4
10915	8160	B3890R536	0.0 - 1.0	< 3.7	.9 \pm 0.5	1.9 \pm 0.7
			4.0 - 5.0	5.1 \pm 3.8	.5 \pm 0.4	3.8 \pm 0.6
			7.0 - 8.0	< 2.5	.4 \pm 0.3	1.1 \pm 0.6
			8.0 - 9.0	< 3.3	.8 \pm 0.3	.7 \pm 0.4
			9.0 - 10.0	< 6	< .6	< .6
10925	8065	B3890R565	0.0 - 1.0	< 2.6	< .6	.9 \pm 0.5
			5.0 - 6.0	< 4.5	.5 \pm 0.1	.7 \pm 0.3
			6.0 - 7.0	< 3.6	< .8	< 1.2
			7.0 - 8.0	< 2.2	< .6	< .8
10925	8075	B3890R548	0.0 - 1.0	< 2.1	.6 \pm 0.3	.7 \pm 0.4
			4.0 - 5.0	< 2.4	.8 \pm 0.3	.8 \pm 0.5
			8.0 - 10.0	< 2.4	.6 \pm 0.3	.7 \pm 0.4
10975	8100	B3890R537	0.0 - 1.0	< 2.4	.6 \pm 0.3	.9 \pm 0.4
			5.0 - 6.0	< 3.8	1.5 \pm 0.4	5.2 \pm 0.7
			10.0 - 11.0	< 4.2	.7 \pm 0.4	1.2 \pm 0.7
			11.0 - 12.0	< 3.9	.5 \pm 0.4	1 \pm 0.5

Table F-2
Downhole Gamma Logging Results,
200 Route 17

Page 1 of 14

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R544^d</u>			
10549	8252	0.5	6000
10549	8252	1.0	10000
10549	8252	1.5	13000
10549	8252	2.0	15000
10549	8252	2.5	20000
10549	8252	3.0	22000
10549	8252	3.5	26000
10549	8252	4.0	25000
10549	8252	4.5	15000
10549	8252	5.0	13000
10549	8252	5.5	12000
10549	8252	6.0	11000
10549	8252	6.5	9000
10549	8252	7.0	9000
<u>Borehole B3890R552^d</u>			
10590	8150	0.5	7000
10590	8150	1.0	7000
10590	8150	1.5	11000
10590	8150	2.0	9000
10590	8150	2.5	10000
10590	8150	3.0	9000
10590	8150	3.5	11000
10590	8150	4.0	11000
10590	8150	4.5	12000
10590	8150	5.0	12000
<u>Borehole B3890R551^d</u>			
10650	8050	0.5	8000
10650	8050	1.0	13000
10650	8050	1.5	13000
10650	8050	2.0	11000
10650	8050	2.5	10000
10650	8050	3.0	11000
10650	8050	3.5	10000
10650	8050	4.0	9000
10650	8050	4.5	12000
10650	8050	5.0	11000
10650	8050	5.5	10000
10650	8050	6.0	10000

Table F-2
(continued)

Page 2 of 14

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R545^d</u>			
10650	8303	0.5	5000
10650	8303	1.0	7000
10650	8303	1.5	9000
10650	8303	2.0	10000
10650	8303	2.5	10000
10650	8303	3.0	10000
10650	8303	3.5	11000
10650	8303	4.0	12000
10650	8303	4.5	12000
10650	8303	5.0	12000
10650	8303	5.5	11000
10650	8303	6.0	10000
10650	8303	6.5	10000
10650	8303	7.0	10000
<u>Borehole B3890R569</u>			
10680	8330	0.5	12000
10680	8330	1.0	12000
10680	8330	1.5	8000
10680	8330	2.0	7000
10680	8330	2.5	6000
10680	8330	3.0	7000
10680	8330	3.5	7000
10680	8330	4.0	8000
10680	8330	4.5	12000
10680	8330	5.0	14000
10680	8330	5.5	11000
10680	8330	6.0	10000
10680	8330	6.5	11000
10680	8330	7.0	10000
10680	8330	7.5	10000
10680	8330	8.0	10000
<u>Borehole B3890R568</u>			
10738	8290	0.5	7000
10738	8290	1.0	7000
10738	8290	1.5	8000

Table F-2
(continued)

Page 3 of 14

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R568 (continued)</u>			
10738	8290	2.0	9000
10738	8290	2.5	8000
10738	8290	3.0	8000
10738	8290	3.5	8000
10738	8290	4.0	7000
10738	8290	4.5	11000
10738	8290	5.0	11000
10738	8290	5.5	11000
10738	8290	6.0	11000
10738	8290	6.5	9000
10738	8290	7.0	9000
10738	8290	7.5	9000
10738	8290	8.0	9000
<u>Borehole B3890R546^d</u>			
10749	8052	0.5	9000
10749	8052	1.0	16000
10749	8052	1.5	18000
10749	8052	2.0	13000
10749	8052	2.5	11000
10749	8052	3.0	10000
10749	8052	3.5	5000
10749	8052	4.0	5000
10749	8052	4.5	5000
<u>Borehole B3890R550^d</u>			
10750	7950	0.5	5000
10750	7950	1.0	5000
10750	7950	1.5	9000
10750	7950	2.0	14000
10750	7950	2.5	14000
10750	7950	3.0	13000
10750	7950	3.5	13000
10750	7950	4.0	11000
10750	7950	4.5	10000
10750	7950	5.0	9000
10750	7950	5.5	10000
10750	7950	6.0	10000

Table F-2
(continued)

Page 4 of 14

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R543^d</u>			
10750	8250	0.5	6000
10750	8250	1.0	9000
10750	8250	1.5	9000
10750	8250	2.0	9000
10750	8250	2.5	11000
10750	8250	3.0	14000
10750	8250	3.5	13000
10750	8250	4.0	10000
10750	8250	4.5	10000
10750	8250	5.0	10000
10750	8250	5.5	10000
10750	8250	6.0	9000
10750	8250	6.5	11000
10750	8250	7.0	11000
<u>Borehole B3890R626^d</u>			
10760	8262	0.5	7000
10760	8262	1.0	9000
10760	8262	1.5	9000
10760	8262	2.0	9000
10760	8262	2.5	10000
10760	8262	3.0	10000
10760	8262	3.5	9000
10760	8262	4.0	9000
10760	8262	4.5	9000
10760	8262	5.0	9000
10760	8262	5.5	9000
10760	8262	6.0	9000
10760	8262	6.5	8000
10760	8262	7.0	7000
<u>Borehole B3890R567^d</u>			
10793	8250	0.5	5000
10793	8250	1.0	6000
10793	8250	1.5	8000
10793	8250	2.0	7000
10793	8250	2.5	6000
10793	8250	3.0	6000
10793	8250	3.5	6000
10793	8250	4.0	7000

Table F-2
(continued)

Page 5 of 14

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R567^d</u> (continued)			
10793	8250	4.5	9000
10793	8250	5.0	10000
10793	8250	5.5	9000
10793	8250	6.0	9000
10793	8250	6.5	9000
10793	8250	7.0	9000
10793	8250	7.5	9000
<u>Borehole B3890R540^d</u>			
10805	8145	0.5	7000
10805	8145	1.0	10000
10805	8145	1.5	10000
10805	8145	2.0	10000
10805	8145	2.5	9000
10805	8145	3.0	9000
10805	8145	3.5	9000
10805	8145	4.0	9000
10805	8145	4.5	9000
10805	8145	5.0	9000
<u>Borehole B3890C628</u>			
10808	8227	0.5	5000
10808	8227	1.0	8000
10808	8227	1.5	11000
10808	8227	2.0	13000
10808	8227	2.5	12000
10808	8227	3.0	10000
10808	8227	3.5	9000
10808	8227	4.0	9000
10808	8227	4.5	8000
10808	8227	5.0	8000
10808	8227	5.5	8000
10808	8227	6.0	8000
10808	8227	6.5	7000
10808	8227	7.0	6000
10808	8227	7.5	7000
10808	8227	8.0	7000

Table F-2
(continued)

Page 6 of 14

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R571</u>			
10820	8205	0.5	9000
10820	8205	1.0	9000
10820	8205	1.5	12000
10820	8205	2.0	13000
10820	8205	2.5	14000
10820	8205	3.0	11000
10820	8205	3.5	9000
10820	8205	4.0	10000
10820	8205	4.5	10000
10820	8205	5.0	10000
10820	8205	5.5	10000
10820	8205	6.0	11000
10820	8205	6.5	10000
10820	8205	7.0	8000
10820	8205	7.5	8000
10820	8205	8.0	8000
<u>Borehole B3890R557^d</u>			
10830	8175	0.5	5000
10830	8175	1.0	6000
10830	8175	1.5	10000
10830	8175	2.0	14000
10830	8175	2.5	13000
10830	8175	3.0	10000
10830	8175	3.5	11000
10830	8175	4.0	11000
<u>Borehole B3890R555^d</u>			
10830	8215	0.5	7000
10830	8215	1.0	9000
10830	8215	1.5	10000
10830	8215	2.0	15000
10830	8215	2.5	18000
10830	8215	3.0	30000
10830	8215	3.5	20000
10830	8215	4.0	13000
10830	8215	4.5	11000
10830	8215	5.0	11000
10830	8215	5.5	10000

Table F-2
(continued)

Page 7 of 14

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R556^d</u>			
10848	8175	0.5	8000
10848	8175	1.0	20000
10848	8175	1.5	46000
10848	8175	2.0	164000
10848	8175	2.5	120000
10848	8175	3.0	23000
10848	8175	3.5	13000
10848	8175	4.0	11000
<u>Borehole B3890R541^d</u>			
10850	8100	0.5	5000
10850	8100	1.0	8000
10850	8100	1.5	16000
10850	8100	2.0	16000
10850	8100	2.5	12000
10850	8100	3.0	14000
10850	8100	3.5	12000
<u>Borehole B3890R539^d</u>			
10850	8150	0.5	7000
10850	8150	1.0	9000
10850	8150	1.5	10000
10850	8150	2.0	13000
10850	8150	2.5	10000
10850	8150	3.0	9000
10850	8150	3.5	10000
10850	8150	4.0	10000
10850	8150	4.5	11000
10850	8150	5.0	11000
<u>Borehole B3890R538^d</u>			
10850	8200	0.5	16000
10850	8200	1.0	25000
10850	8200	1.5	61000
10850	8200	2.0	34000
10850	8200	2.5	11000
10850	8200	3.0	10000
10850	8200	3.5	10000
10850	8200	4.0	10000

Table F-2
(continued)

Page 8 of 14

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3590R558^d</u>			
10870	8135	0.5	8000
10870	8135	1.0	10000
10870	8135	1.5	12000
10870	8135	2.0	10000
10870	8135	2.5	10000
10870	8135	3.0	9000
10870	8135	3.5	9000
10870	8135	4.0	9000
<u>Borehole B3890R554^d</u>			
10871	8187	0.5	17000
10871	8187	1.0	41000
10871	8187	1.5	48000
10871	8187	2.0	30000
10871	8187	2.5	31000
10871	8187	3.0	32000
10871	8187	3.5	31000
10871	8187	4.0	26000
10871	8187	4.5	13000
10871	8187	5.0	11000
10871	8187	5.5	11000
10871	8187	6.0	11000
10871	8187	6.5	11000
10871	8187	7.0	10000
<u>Borehole B3890R561^d</u>			
10890	8100	0.5	7000
10890	8100	1.0	7000
10890	8100	1.5	10000
10890	8100	2.0	12000
10890	8100	2.5	13000
10890	8100	3.0	12000
10890	8100	3.5	12000
10890	8100	4.0	13000
10890	8100	4.5	12000
10890	8100	5.0	12000

Table F-2
(continued)

Page 9 of 14

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R560^d</u>			
10890	8125	0.5	8000
10890	8125	1.0	9000
10890	8125	1.5	9000
10890	8125	2.0	10000
10890	8125	2.5	10000
10890	8125	3.0	10000
10890	8125	3.5	11000
10890	8125	4.0	10000
<u>Borehole B3890R547^d</u>			
10900	8050	0.5	8000
10900	8050	1.0	9000
10900	8050	1.5	12000
10900	8050	2.0	12000
10900	8050	2.5	12000
10900	8050	3.0	11000
10900	8050	3.5	10000
10900	8050	4.0	12000
10900	8050	4.5	11000
10900	8050	5.0	11000
10900	8050	5.5	10000
10900	8050	6.0	10000
<u>Borehole B3890R564^d</u>			
10900	8075	0.5	5000
10900	8075	1.0	9000
10900	8075	1.5	13000
10900	8075	2.0	15000
10900	8075	2.5	18000
10900	8075	3.0	12000
10900	8075	3.5	11000
10900	8075	4.0	12000
10900	8075	4.5	11000
10900	8075	5.0	11000
10900	8075	5.5	11000
10900	8075	6.0	11000

Table F-2
(continued)

Page 10 of 14

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R542^d</u>			
10900	8100	0.5	15000
10900	8100	1.0	22000
10900	8100	1.5	35000
10900	8100	2.0	106000
10900	8100	2.5	168000
10900	8100	3.0	43000
10900	8100	3.5	21000
10900	8100	4.0	22000
10900	8100	4.5	22000
10900	8100	5.0	15000
<u>Borehole B3890C570</u>			
10900	8123	0.5	18000
10900	8123	1.0	24000
10900	8123	1.5	53000
10900	8123	2.0	77000
10900	8123	2.5	132000
10900	8123	3.0	74000
10900	8123	3.5	29000
10900	8123	4.0	18000
10900	8123	4.5	17000
10900	8123	5.0	18000
10900	8123	5.5	18000
10900	8123	6.0	22000
10900	8123	6.5	22000
10900	8123	7.0	22000
<u>Borehole B3890R559^d</u>			
10900	8125	0.5	10000
10900	8125	1.0	21000
10900	8125	1.5	89000
10900	8125	2.0	163000
10900	8125	2.5	166000
10900	8125	3.0	48000
10900	8125	3.5	20000
10900	8125	4.0	13000
10900	8125	4.5	13000
10900	8125	5.0	12000
10900	8125	5.5	13000
10900	8125	6.0	13000
10900	8125	6.5	11000

Table F-2
(continued)

Page 11 of 14

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R553^d</u>			
10905	8173	0.5	16000
10905	8173	1.0	24000
10905	8173	1.5	29000
10905	8173	2.0	34000
10905	8173	2.5	39000
10905	8173	3.0	49000
10905	8173	3.5	34000
10905	8173	4.0	14000
10905	8173	4.5	10000
10905	8173	5.0	10000
10905	8173	5.5	10000
10905	8173	6.0	10000
10905	8173	6.5	10000
10905	8173	7.0	11000
10905	8173	7.5	11000
10905	8173	8.0	10000
<u>Borehole B3890R566^d</u>			
10910	8050	0.5	9000
10910	8050	1.0	12000
10910	8050	1.5	12000
10910	8050	2.0	13000
10910	8050	2.5	11000
10910	8050	3.0	10000
10910	8050	3.5	10000
10910	8050	4.0	11000
10910	8050	4.5	10000
<u>Borehole B3890R562^d</u>			
10910	8100	0.5	7000
10910	8100	1.0	10000
10910	8100	1.5	12000
10910	8100	2.0	11000
10910	8100	2.5	12000
10910	8100	3.0	11000
10910	8100	3.5	12000
10910	8100	4.0	11000
10910	8100	4.5	12000
10910	8100	5.0	11000

Table F-2
(continued)

Page 12 of 14

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R563^d</u>			
10910	8125	0.5	6000
10910	8125	1.0	6000
10910	8125	1.5	9000
10910	8125	2.0	10000
10910	8125	2.5	11000
10910	8125	3.0	11000
10910	8125	3.5	11000
10910	8125	4.0	10000
10910	8125	4.5	10000
<u>Borehole B3890R549^d</u>			
10915	8065	0.5	6000
10915	8065	1.0	9000
10915	8065	1.5	14000
10915	8065	2.0	13000
10915	8065	2.5	21000
10915	8065	3.0	57000
10915	8065	3.5	64000
10915	8065	4.0	18000
10915	8065	4.5	13000
10915	8065	5.0	12000
10915	8065	5.5	12000
10915	8065	6.0	12000
<u>Borehole B3890R536^d</u>			
10915	8160	0.5	10000
10915	8160	1.0	10000
10915	8160	1.5	10000
10915	8160	2.0	17000
10915	8160	2.5	16000
10915	8160	3.0	12000
10915	8160	3.5	11000
10915	8160	4.0	10000
10915	8160	4.5	9000
10915	8160	5.0	9000
10915	8160	5.5	10000
10915	8160	6.0	9000
10915	8160	6.5	10000
10915	8160	7.0	9000

Table F-2
(continued)

Page 13 of 14

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R565^d</u>			
10925	8065	0.5	5000
10925	8065	1.0	9000
10925	8065	1.5	12000
10925	8065	2.0	15000
10925	8065	2.5	21000
10925	8065	3.0	17000
10925	8065	3.5	13000
10925	8065	4.0	12000
10925	8065	4.5	12000
10925	8065	5.0	12000
<u>Borehole B3890R548^d</u>			
10925	8075	0.5	7000
10925	8075	1.0	11000
10925	8075	1.5	12000
10925	8075	2.0	12000
10925	8075	2.5	12000
10925	8075	3.0	12000
10925	8075	3.5	11000
10925	8075	4.0	12000
10925	8075	4.5	12000
10925	8075	5.0	11000
10925	8075	5.5	11000
10925	8075	6.0	10000
10925	8075	6.5	11000
10925	8075	7.0	14000
10925	8075	7.5	14000
10925	8075	8.0	11000
<u>Borehole B3890R537^d</u>			
10975	8100	0.5	21000
10975	8100	1.0	20000
10975	8100	1.5	16000
10975	8100	2.0	12000
10975	8100	2.5	11000
10975	8100	3.0	12000
10975	8100	3.5	11000
10975	8100	4.0	11000
10975	8100	4.5	11000
10975	8100	5.0	11000
10975	8100	5.5	11000

Table F-2
(continued)

Page 14 of 14

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R537^d</u> (continued)			
10975	8100	6.0	12000
10975	8100	6.5	12000
10975	8100	7.0	12000
10975	8100	7.5	12000
10975	8100	8.0	12000
10975	8100	8.5	12000
10975	8100	9.0	12000
10975	8100	9.5	12000
10975	8100	10.0	12000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table F-3
Gamma Radiation Exposure Rates,
200 Route 17

Coordinates ^a		Rate ^b (μ R/h)
East	North	
10570	8180	6
10650	8060	6
10660	8320	7
10750	8000	5
10750	8250	7
10890	8180	20
10930	8130	19
10940	8090	17
10950	8120	23

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table F-4
Surface and Subsurface Radionuclide Concentrations in Soil,
Essex Street and State Route 17

Page 1 of 4

<u>Coordinates</u>		Borehole No.	Depth (ft)	<u>Concentration (pCi/g ± 2 sigma)</u>		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
11040	7720		0.0 - 0.5	6.1 ± 4.5	1 ± 0.6	3.8 ± 0.9
11050	7750		0.0 - 0.5	< 1.7	.3 ± 0.2	.4 ± 0.3
11090	7850		0.0 - 0.5	< 8.3	5.1 ± 0.8	24 ± 2
11100	7720		0.0 - 0.5	< 3	1.4 ± 0.5	6.1 ± 0.3
11100	7740		0.0 - 0.5	< 7.6	1.6 ± 0.6	6.9 ± 1.2
11100	7770		0.0 - 0.5	< 4	1.3 ± 0.4	4.9 ± 0.5
11100	7900		0.0 - 0.5	< 3.9	.9 ± 0.3	2.7 ± 0.7
11140	7960		0.0 - 0.5	< 3.3	< .7	2.9 ± 1.5
11150	7750		0.0 - 0.5	< 1.6	.4 ± 0.3	< .5
11150	7940		0.0 - 0.5	< 3.1	< .6	2.6 ± 1.0
11160	7920		0.0 - 0.5	15 ± 14	1.4 ± 1.2	2.8 ± 1.7
11170	7920		0.0 - 0.5	< 2.9	.9 ± 0.3	2.2 ± 0.4
11184	7806		0.0 - 0.5	3.2 ± 3.0	1.5 ± 0.5	3.7 ± 0.9
11184	7822		0.0 - 0.5	< 4.1	2.6 ± 0.8	15 ± 4
11184	7826		0.0 - 0.5	< 5.4	1.8 ± 0.6	10 ± 1
11190	7900		0.0 - 0.5	< 7.2	.7 ± 0.2	2.1 ± 0.5
11200	7810		0.0 - 0.5	< 8.1	1.4 ± 0.4	5.8 ± 1.2
11210	7880		0.0 - 0.5	< 2.7	< .6	1.6 ± 0.8
11220	7860		0.0 - 0.5	< 4.3	< .9	3.1 ± 0.9
11240	7830		0.0 - 0.5	< 3.2	.8 ± 0.1	< 1

Table F-4
(continued)

Page 2 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
11240	7850		0.0 - 0.5	< 2.9	< .7	1.4 \pm 0.3
11250	7750		0.0 - 0.5	< 2.6	< .4	1.1 \pm 0.1
11260	7730		0.0 - 0.5	< 9.1	1 \pm 0.8	1.6 \pm 0.9
11260	7820		0.0 - 0.5	< 3.6	< .9	2.4 \pm 0.8
11280	7800		0.0 - 0.5	< 3.1	< .7	2.1 \pm 0.2
11290	7780		0.0 - 0.5	< 3.9	< .9	2.8 \pm 1.7
11310	7760		0.0 - 0.5	5.3 \pm 3.9	1.9 \pm 0.3	7.5 \pm 0.7
Subsurface						
11020	7850	B3890R576	0.0 - 2.0	< 4.5	1 \pm 0.2	2.2 \pm 0.6
			4.0 - 5.0	< 8.6	1 \pm 0.3	2.2 \pm 0.4
			7.0 - 8.0	< 3.1	< .7	< .8
11024	7769	B3890R533	0.0 - 1.0	< 2.4	< .5	< .7
			4.0 - 5.0	< 2.3	< .5	1.5 \pm 0.3
			7.0 - 8.0	< 4.6	.4 \pm 0.2	.7 \pm 0.5
11025	7800	B3890R575	0.0 - 1.0	< 2.3	1.2 \pm 0.3	1 \pm 0.4
			2.0 - 4.0	< 4.3	1.6 \pm 0.3	1.3 \pm 0.3
			4.0 - 5.0	< 2.2	1.3 \pm 0.3	1.1 \pm 0.2
			7.0 - 8.0	< 1.2	.8 \pm 0.4	.7 \pm 0.3
11026	7742	B3890R573	0.0 - 1.0	< 5.5	1.8 \pm 0.6	< 1.3
			7.0 - 8.0	< 2.7	< .6	< .8
			14.0 - 15.0	< 3.7	< .8	< 1.2
11035	7730	B3890R513	0.0 - 1.0	< 4.2	1.8 \pm 0.6	1.5 \pm 0.8
			4.0 - 5.0	< 7.3	1.5 \pm 0.8	2 \pm 0.8
			7.0 - 8.0	< 3.9	.8 \pm 0.4	.6 \pm 0.4
11035	7800	B3890R574	0.0 - 1.0	< 2.4	1.3 \pm 0.3	.9 \pm 0.3
			3.0 - 4.0	< 2.3	.8 \pm 0.3	1.3 \pm 0.2
			11.0 - 12.0	< 2.1	1.3 \pm 0.3	.9 \pm 0.3
11045	7800	B3890R512	0.0 - 1.0	3.8 \pm 2.5	.9 \pm 0.1	1.3 \pm 0.9
			9.0 - 10.0	< 2.3	.6 \pm 0.3	< .6

Table F-4
(continued)

Page 3 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
11045	7850	B3890R507	0.0 - 1.0	< 2.6	< .6	.7 \pm 0.2
			5.0 - 6.0	< 4.8	.6 \pm 0.1	.7 \pm 0.5
			7.0 - 8.0	< 2.4	< .5	.9 \pm 0.4
11050	7900	B3890R502	0.0 - 2.0	< 2.5	< .5	.8 \pm 0.3
			6.0 - 7.0	< 2.5	< .5	1.1 \pm 0.7
			11.0 - 12.0	< 4.2	.5 \pm 0.2	.8 \pm 0.2
11080	7868	B3890R509	0.0 - 2.0	< 2.7	.6 \pm 0.1	< .7
			3.0 - 4.0	< 2.3	.4 \pm 0.1	< .6
			5.0 - 6.0	< 2.6	.7 \pm 0.2	.9 \pm 0.1
11089	7852	B3890R515	0.0 - 1.0	< 8.6	.9 \pm 0.4	6.1 \pm 1.1
			1.0 - 2.0	< 5.1	.8 \pm 0.4	3.5 \pm 1.0
			5.0 - 6.0	< 6.3	.8 \pm 0.4	1.2 \pm 0.5
11100	7750	B3890R516	0.0 - 2.0	< 3	.8 \pm 0.5	< .9
			4.0 - 5.0	< 3.2	.6 \pm 0.4	< .8
			7.0 - 8.0	< 3	.3 \pm 0.3	.6 \pm 0.4
11110	7795	B3890R527	0.0 - 1.0	< 4	1 \pm 0.6	1.7 \pm 1.0
			4.0 - 5.0	< 4.2	.5 \pm 0.4	1 \pm 0.5
			7.0 - 8.0	< 5.1	1 \pm 0.4	1.2 \pm 0.6
11144	7950	B3890R505	0.0 - 2.0	< 2.7	< .5	< .8
			5.0 - 6.0	< 2.2	.5 \pm 0.1	.7 \pm 0.3
			7.0 - 8.0	< 2.8	< .5	.9 \pm 0.3
11180	7820	B3890R511	0.0 - 1.0	< 6	1.3 \pm 0.5	4.9 \pm 1.0
			1.0 - 2.0	< 5.8	< .4	1 \pm 0.4
			7.0 - 8.0	< 2.3	.5 \pm 0.3	1.1 \pm 0.5
11184	7806	AS086	1.5 - 2.0	< 2	.5 \pm 0.2	.6 \pm 0.2
			3.0 - 3.5	< 2.2	1 \pm 0.4	1 \pm 0.7
11184	7822	AS085	1.5 - 2.0	< 2.9	.4 \pm 0.2	1.1 \pm 0.3
			3.0 - 3.5	< 2.3	.7 \pm 0.3	.7 \pm 0.3
11184	7826	AS088	0.5 - 1.0	< 2.7	.5 \pm 0.4	2.7 \pm 0.7
			2.0 - 2.5	< 2.9	.6 \pm 0.3	.7 \pm 0.4
			3.5 - 4.0	< 4.3	.5 \pm 0.3	.9 \pm 0.4

Table F-4
(continued)

Page 4 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
11200	7750	B3890R510	0.0 - 1.0	< 5.7		
			3.0 - 4.0	< 1.9	.6 \pm 0.3	< .6
			5.0 - 6.0	< 3.8	.5 \pm 0.4	.9 \pm 0.5
					.9 \pm 0.3	1.2 \pm 0.5
11200	7810	AS087	1.5 - 2.0	< 2.2	.8 \pm 0.4	1.2 \pm 0.4
11250	7800	B3890R504	0.0 - 1.0	< 3.8	1.2 \pm 0.4	.6 \pm 0.4
			3.0 - 4.0	< 5.5	.8 \pm 0.5	.7 \pm 0.6
			7.0 - 8.0	< 4	.9 \pm 0.5	1 \pm 0.6
11280	7775	B3890R501	0.0 - 1.0	< 6.7	< .5	.7 \pm 0.5
			5.0 - 6.0	< 2.8	< .6	.9 \pm 0.8
			7.0 - 8.0	< 5.5	.9 \pm 0.4	1.6 \pm 0.7
11300	7741	B3890R506	0.0 - 1.0	< 3.8	< .7	2.9 \pm 0.8
			2.0 - 3.0	< 3.2	< .7	< .9
			5.0 - 6.0	< 2.2	.7 \pm 0.2	.9 \pm 0.5
			6.0 - 7.0	< 2.7	< .6	1 \pm 0.4
11322	7750	B3890R503	0.0 - 1.0	< 5.7	< .8	4.7 \pm 1.6
			5.0 - 6.0	< 2.5	< .5	.8 \pm 0.2
			9.0 - 10.0	< 3	< .5	.8 \pm 0.2
11332	7762	B3890R508	0.0 - 1.0	< 3.6	1 \pm 0.5	1.8 \pm 0.8
			6.0 - 7.0	< 4.2	.6 \pm 0.2	.7 \pm 0.1
			7.0 - 8.0	< 2.4	< .4	< .5
			8.0 - 9.0	< 2.8	.6 \pm 0.2	1.1 \pm 0.2
			9.0 - 10.0	< 3.9	.4 \pm 0.1	.6 \pm 0.1

Table F-5
Downhole Gamma Logging Results,
Essex Street and State Route 17

Page 1 of 9

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R576^d</u>			
11020	7850	0.5	12000
11020	7850	1.0	18000
11020	7850	1.5	18000
11020	7850	2.0	19000
11020	7850	2.5	18000
11020	7850	3.0	18000
11020	7850	3.5	18000
11020	7850	4.0	19000
11020	7850	4.5	18000
11020	7850	5.0	17000
11020	7850	5.5	15000
11020	7850	6.0	11000
11020	7850	6.5	11000
11020	7850	7.0	10000
11020	7850	7.5	11000
<u>Borehole B3890R533^d</u>			
11024	7769	0.5	7000
11024	7769	1.0	10000
11024	7769	1.5	21000
11024	7769	2.0	25000
11024	7769	2.5	26000
11024	7769	3.0	24000
11024	7769	3.5	18000
11024	7769	4.0	11000
11024	7769	4.5	11000
11024	7769	5.0	12000
11024	7769	5.5	11000
<u>Borehole B3890R575</u>			
11025	7800	0.5	8000
11025	7800	1.0	10000
11025	7800	1.5	16000
11025	7800	2.0	23000
11025	7800	2.5	26000
11025	7800	3.0	27000
11025	7800	3.5	26000
11025	7800	4.0	25000
11025	7800	4.5	22000

Table F-5
(continued)

Page 2 of 9

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R575 (continued)</u>			
11025	7800	5.0	17000
11025	7800	5.5	14000
11025	7800	6.0	13000
11025	7800	6.5	12000
11025	7800	7.0	10000
11025	7800	7.5	8000
11025	7800	8.0	8000
<u>Borehole B3890R573^d</u>			
11026	7742	0.5	9000
11026	7742	1.0	13000
11026	7742	1.5	13000
11026	7742	2.0	9000
11026	7742	2.5	8000
11026	7742	3.0	8000
11026	7742	3.5	11000
11026	7742	4.0	13000
11026	7742	4.5	14000
11026	7742	5.0	13000
11026	7742	5.5	11000
11026	7742	6.0	9000
11026	7742	6.5	8000
11026	7742	7.0	7000
11026	7742	7.5	7000
11026	7742	8.0	7000
11026	7742	8.5	7000
11026	7742	9.0	7000
11026	7742	9.5	8000
11026	7742	10.0	8000
11026	7742	10.5	8000
11026	7742	11.0	8000
11026	7742	11.5	8000
11026	7742	12.0	8000
11026	7742	12.5	9000
11026	7742	13.0	9000
11026	7742	13.5	9000
11026	7742	14.0	9000
11026	7742	14.5	9000

Table F-5
(continued)

Page 3 of 9

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R513^d</u>			
11035	7730	0.5	7000
11035	7730	1.0	7000
11035	7730	1.5	7000
11035	7730	2.0	12000
11035	7730	2.5	13000
11035	7730	3.0	12000
11035	7730	3.5	12000
11035	7730	4.0	11000
11035	7730	4.5	12000
11035	7730	5.0	14000
11035	7730	5.5	14000
11035	7730	6.0	13000
11035	7730	6.5	12000
11035	7730	7.0	11000
11035	7730	7.5	9000
<u>Borehole B3890R574^d</u>			
11035	7800	0.5	10000
11035	7800	1.0	14000
11035	7800	1.5	22000
11035	7800	2.0	26000
11035	7800	2.5	25000
11035	7800	3.0	23000
11035	7800	3.5	17000
11035	7800	4.0	14000
11035	7800	4.5	14000
11035	7800	5.0	12000
11035	7800	5.5	10000
11035	7800	6.0	10000
11035	7800	6.5	8000
11035	7800	7.0	8000
11035	7800	7.5	8000
11035	7800	8.0	8000
11035	7800	8.5	8000
11035	7800	9.0	9000
11035	7800	9.5	10000
11035	7800	10.0	10000
11035	7800	10.5	9000
11035	7800	11.0	9000
11035	7800	11.5	8000

Table F-5
(continued)

Page 4 of 9

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R512^d</u>			
11045	7800	0.5	8000
11045	7800	1.0	10000
11045	7800	1.5	13000
11045	7800	2.0	12000
11045	7800	2.5	10000
11045	7800	3.0	10000
11045	7800	3.5	10000
11045	7800	4.0	10000
11045	7800	4.5	11000
11045	7800	5.0	12000
11045	7800	5.5	12000
11045	7800	6.0	11000
11045	7800	6.5	11000
11045	7800	7.0	10000
11045	7800	7.5	10000
11045	7800	8.0	10000
11045	7800	8.5	10000
11045	7800	9.0	9000
11045	7800	9.5	10000
<u>Borehole B3890R507^d</u>			
11045	7850	0.5	7000
11045	7850	1.0	7000
11045	7850	1.5	9000
11045	7850	2.0	11000
11045	7850	2.5	11000
11045	7850	3.0	11000
11045	7850	3.5	10000
11045	7850	4.0	10000
11045	7850	4.5	10000
11045	7850	5.0	10000
11045	7850	5.5	10000
11045	7850	6.0	11000
11045	7850	6.5	11000
11045	7850	7.0	11000
11045	7850	7.5	10000

Table F-5
(continued)

Page 5 of 9

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R502^d</u>			
11050	7900	0.5	9000
11050	7900	1.0	9000
11050	7900	1.5	10000
11050	7900	2.0	10000
11050	7900	2.5	11000
11050	7900	3.0	10000
11050	7900	3.5	10000
11050	7900	4.0	10000
11050	7900	4.5	10000
11050	7900	5.0	11000
11050	7900	5.5	10000
11050	7900	6.0	9000
11050	7900	6.5	9000
11050	7900	7.0	9000
11050	7900	7.5	9000
11050	7900	8.0	9000
11050	7900	8.5	9000
11050	7900	9.0	8000
11050	7900	9.5	8000
11050	7900	10.0	8000
11050	7900	10.5	9000
11050	7900	11.0	9000
11050	7900	11.5	11000
<u>Borehole B3890R509</u>			
11080	7868	0.5	7000
11080	7868	1.0	7000
11080	7868	1.5	7000
11080	7868	2.0	8000
11080	7868	2.5	11000
11080	7868	3.0	9000
11080	7868	3.5	10000
11080	7868	4.0	9000
11080	7868	4.5	9000
11080	7868	5.0	9000
11080	7868	5.5	10000
11080	7868	6.0	10000

Table F-5
(continued)

Page 6 of 9

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R515^d</u>			
11089	7852	0.5	23000
11089	7852	1.0	30000
11089	7852	1.5	24000
11089	7852	2.0	18000
11089	7852	2.5	16000
11089	7852	3.0	14000
11089	7852	3.5	12000
11089	7852	4.0	11000
<u>Borehole B3890R527^d</u>			
11110	7795	0.5	12000
11110	7795	1.0	15000
11110	7795	1.5	16000
11110	7795	2.0	16000
11110	7795	2.5	14000
11110	7795	3.0	11000
11110	7795	3.5	10000
11110	7795	4.0	10000
11110	7795	4.5	10000
11110	7795	5.0	9000
11110	7795	5.5	10000
11110	7795	6.0	11000
11110	7795	6.5	13000
11110	7795	7.0	13000
<u>Borehole B3890R505</u>			
11144	7950	0.5	8000
11144	7950	1.0	7000
11144	7950	1.5	7000
11144	7950	2.0	8000
11144	7950	2.5	10000
11144	7950	3.0	11000
11144	7950	3.5	11000
11144	7950	4.0	11000
11144	7950	4.5	11000
11144	7950	5.0	12000
11144	7950	5.5	11000
11144	7950	6.0	12000
11144	7950	6.5	12000
11144	7950	7.0	13000
11144	7950	7.5	14000
11144	7950	8.0	10000

Table F-5
(continued)

Page 7 of 9

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R511^d</u>			
11180	7820	0.5	41000
11180	7820	1.0	35000
11180	7820	1.5	12000
11180	7820	2.0	10000
11180	7820	2.5	11000
11180	7820	3.0	11000
11180	7820	3.5	10000
11180	7820	4.0	10000
11180	7820	4.5	10000
11180	7820	5.0	10000
11180	7820	5.5	10000
11180	7820	6.0	10000
11180	7820	6.5	10000
11180	7820	7.0	10000
<u>Borehole AS086</u>			
11184	7806	0.5	13000
11184	7806	1.0	11000
11184	7806	1.5	8000
11184	7806	2.0	8000
11184	7806	2.5	8000
11184	7806	3.0	8000
<u>Borehole AS085</u>			
11184	7822	0.5	25000
11184	7822	1.0	11000
11184	7822	1.5	9000
11184	7822	2.0	8000
11184	7822	2.5	8000
11184	7822	3.0	8000
<u>Borehole AS088</u>			
11184	7826	0.5	33000
11184	7826	1.0	15000
11184	7826	1.5	10000
11184	7826	2.0	10000
11184	7826	2.5	10000
11184	7826	3.0	9000
11184	7826	3.5	9000

Table F-5
(continued)

Page 8 of 9

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R510^d</u>			
11200	7750	0.5	6000
11200	7750	1.0	6000
11200	7750	1.5	8000
11200	7750	2.0	10000
11200	7750	2.5	10000
11200	7750	3.0	10000
11200	7750	3.5	10000
11200	7750	4.0	10000
<u>Borehole AS087</u>			
11200	7810	0.5	17000
11200	7810	1.0	9000
11200	7810	1.5	8000
<u>Borehole B3890R501^d</u>			
11280	7775	0.5	7000
11280	7775	1.0	9000
11280	7775	1.5	11000
11280	7775	2.0	11000
11280	7775	2.5	11000
11280	7775	3.0	11000
11280	7775	3.5	12000
11280	7775	4.0	12000
11280	7775	4.5	12000
11280	7775	5.0	14000
11280	7775	5.5	13000
11280	7775	6.0	13000
11280	7775	6.5	14000
11280	7775	7.0	14000
<u>Borehole B3890R506^d</u>			
11300	7741	0.5	15000
11300	7741	1.0	16000
11300	7741	1.5	12000
11300	7741	2.0	11000
11300	7741	2.5	12000
11300	7741	3.0	12000
11300	7741	3.5	12000
11300	7741	4.0	12000
11300	7741	4.5	12000
11300	7741	5.0	13000

Table F-5
(continued)

Page 9 of 9

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R503^d</u>			
11322	7750	0.5	14000
11322	7750	1.0	17000
11322	7750	1.5	23000
11322	7750	2.0	15000
11322	7750	2.5	11000
11322	7750	3.0	10000
11322	7750	3.5	11000
11322	7750	4.0	11000
11322	7750	4.5	11000
11322	7750	5.0	12000
11322	7750	5.5	12000
11322	7750	6.0	13000
11322	7750	6.5	14000
11322	7750	7.0	13000
11322	7750	7.5	12000
11322	7750	8.0	11000
<u>Borehole B3890R508^d</u>			
11332	7762	0.5	15000
11332	7762	1.0	18000
11332	7762	1.5	14000
11332	7762	2.0	11000
11332	7762	2.5	10000
11332	7762	3.0	10000
11332	7762	3.5	10000
11332	7762	4.0	10000
11332	7762	4.5	11000
11332	7762	5.0	11000
11332	7762	5.5	10000
11332	7762	6.0	12000
11332	7762	6.5	11000
11332	7762	7.0	10000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table F-6
Gamma Radiation Exposure Rates,
Essex Street and State Route 17

<u>Coordinates^a</u>		<u>Rate^b</u>
East	North	(μ R/h)
11030	7780	6
11080	7730	7
11090	7850	17
11100	7900	7
11180	7910	9
11210	7860	13
11230	7820	17
11290	7720	15

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table F-7
Surface and Subsurface Radionuclide Concentrations in Soil,
113 Essex Street

Page 1 of 4

<u>Coordinates</u>		Borehole No.	Depth (ft)	<u>Concentration (pCi/g ± 2 sigma)</u>		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
10800	7800		0.0 - 0.5	< 3.5	< .8	1.7 ± 0.4
10850	7900		0.0 - 0.5	< 2.9	.7 ± 0.2	1.2 ± 0.5
10960	7740		0.0 - 0.5	< 3	1 ± 0.3	4.9 ± 0.8
10970	7730		0.0 - 0.5	< 2.9	1.5 ± 0.5	5.6 ± 0.7
11000	7730		0.0 - 0.5	< 5.1	1 ± 0.4	4.8 ± 0.3
11000	7900		0.0 - 0.5	< 3.3	< .7	1.3 ± 0.2
11000	7950		0.0 - 0.5	< 2.2	< .5	< .7
11000	8000		0.0 - 0.5	< 2.8	< .6	< .8
11000	8050		0.0 - 0.5	< 3.4	< .7	< 1.2
Subsurface						
10755	7903	B3890R572	0.0 - 1.0	< 7.4	1.1 ± 0.1	2.1 ± 0.6
			4.0 - 5.0	6.7 ± 4.0	< 1	1.3 ± 1.2
			7.0 - 8.0	< 2.3	< .5	< .7
10800	7850	B3890R528	0.0 - 1.0	< 3.8	1.2 ± 0.4	2 ± 0.6
			4.0 - 5.0	< 4.1	< .7	2.5 ± 0.3
			7.0 - 8.0	< 2.3	.7 ± 0.3	< .7
10850	7950	B3890R521	0.0 - 1.0	< 3	< .7	1.1 ± 0.5
			4.0 - 5.0	< 3.6	1.1 ± 0.2	2 ± 0.3
			7.0 - 8.0	< 2.4	< .6	< .8
10875	7735	B3890R535	0.0 - 1.0	< 9.6	1.6 ± 0.3	5.7 ± 0.1
			2.0 - 3.0	< 2.5	.9 ± 0.2	1.1 ± 0.4
			7.0 - 8.0	< 1.7	< .4	< .5
10920	8030	B3890R580	0.0 - 1.0	< 5.3	< 1	2.2 ± 1.5
			3.0 - 4.0	< 7.2	< 1.1	4.8 ± 1.0
			7.0 - 8.0	< 2.3	< .5	< .7

Table F-7
(continued)

Page 2 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
10935	8027	B3890R629	0.0 - 2.0	< 4.5	1.7 \pm 0.4	3.3 \pm 0.5
			4.0 - 5.0	< 3.3	1.3 \pm 0.4	3.4 \pm 0.5
			7.0 - 8.0	< 1.8	.6 \pm 0.2	.9 \pm 0.4
10938	8045	B3890R582	0.0 - 1.0	< 8.5	.8 \pm 0.2	1.6 \pm 0.4
			4.0 - 5.0	< 4.7	< .7	2.4 \pm 0.3
			7.0 - 8.0	< 7.2	.6 \pm 0.3	1.1 \pm 0.3
10942	7722	B3890R631	0.0 - 1.0	< 14	5.2 \pm 1.3	17 \pm 2
			1.0 - 2.0	< 5.2	1.8 \pm 0.3	2.9 \pm 0.6
			7.0 - 8.0	< 2.5	.4 \pm 0.2	< .4
10950	7950	B3890R523	0.0 - 1.0	< 2.7	< .6	1 \pm 0.5
			5.0 - 6.0	< 4.9	.6 \pm 0.2	1.2 \pm 0.2
			9.0 - 10.0	< 4.1	.5 \pm 0.1	.6 \pm 0.1
10950	7980	B3890R581	0.0 - 2.0	1.6 \pm 1.5	.5 \pm 0.2	.9 \pm 0.4
			4.0 - 5.0	< 2.9	.7 \pm 0.2	1.8 \pm 0.3
			9.0 - 10.0	< 3.1	.4 \pm 0.2	.2 \pm 0.1
10950	8000	B3890R632	0.0 - 2.0	< 3.2	1.1 \pm 0.3	1.9 \pm 0.5
			4.0 - 5.0	< 2.1	.8 \pm 0.3	1.9 \pm 0.5
			7.0 - 8.0	< 4.8	.8 \pm 0.3	.9 \pm 0.3
10950	8025	B3890R577	0.0 - 1.0	< 2.6	.9 \pm 0.4	1.5 \pm 0.4
			2.0 - 4.0	1.9 \pm 1.9	.8 \pm 0.3	1.5 \pm 0.5
			4.0 - 5.0	< 5.5	1 \pm 0.3	4.3 \pm 0.7
			8.0 - 10.0	< 1.8	.7 \pm 0.4	.9 \pm 0.6
10950	8050	B3890R524	0.0 - 1.0	< 3	< .6	1.7 \pm 1.1
			4.0 - 5.0	< 2.8	< .6	1.1 \pm 0.2
			7.0 - 8.0	< 2.8	< .7	1.1 \pm 0.4
10953	7726	B3890R625	2.0 - 3.0	< 7.1	2.3 \pm 0.5	3.7 \pm 1.8
			4.0 - 6.0	< 4.6	2.1 \pm 0.6	4.5 \pm 0.7
			6.0 - 8.0	< 2.7	.7 \pm 0.3	.9 \pm 0.3
			9.0 - 10.0	< 3.4	.5 \pm 0.2	1 \pm 0.3
10960	8025	B3890R579	0.0 - 1.0	< 2.9	1.3 \pm 0.4	2.3 \pm 0.6
			3.0 - 4.0	< 3.2	.9 \pm 0.3	3.2 \pm 0.6
			7.0 - 7.5	< 2	.7 \pm 0.3	.9 \pm 0.4

Table F-7
(continued)

Page 3 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
10969	7735	B3890R624	2.0 - 4.0	< 3.3	1.3 \pm 0.3	2.2 \pm 0.4
			6.0 - 8.0	< 2.6	1.5 \pm 0.4	3.7 \pm 0.5
			8.0 - 10.0	.9 \pm 0.9	.7 \pm 0.3	1.4 \pm 0.4
			10.0 - 11.0	2.1 \pm 1.5	.4 \pm 0.1	.6 \pm 0.2
			11.0 - 12.0	< 1.8	.5 \pm 0.2	1 \pm 0.2
10970	8050	B3890R578	0.0 - 1.0	< 3.8	< .8	< 1.3
			5.0 - 6.0	< 3.3	.6 \pm 0.2	< .9
			9.0 - 10.0	< 4	< .8	< 1.2
10975	7910	B3890R634	2.0 - 3.0	< 3.8	< .9	1.8 \pm 0.5
			7.0 - 8.0	< 2.8	< .6	< .9
			8.0 - 9.0	< 2.6	< .6	< .6
			11.0 - 12.0	< 2.4	< .6	.8 \pm 0.3
10975	8025	B3890R526	0.0 - 1.0	< 6.2	1 \pm 0.1	1.3 \pm 0.5
			2.0 - 3.0	< 6.7	.8 \pm 0.1	1.4 \pm 0.2
			7.0 - 8.0	< 2.2	< .5	< .7
10983	7715	B3890R522	0.0 - 1.0	8.2 \pm 4.1	1.4 \pm 0.2	4.7 \pm 0.5
			3.0 - 4.0	< 2.4	.8 \pm 0.2	2.2 \pm 0.7
			6.0 - 7.0	< 1.7	.4 \pm 0.2	.5 \pm 0.3
			7.0 - 8.0	< 2	.5 \pm 0.2	< .6
			8.0 - 9.0	< 2	.6 \pm 0.2	.6 \pm 0.2
10985	7905	B3890R633	5.0 - 7.0	< 2.4	.8 \pm 0.2	.6 \pm 0.3
			7.0 - 9.0	6.9 \pm 4.8	10 \pm 1	18 \pm 1
			10.0 - 11.0	< 4.1	.4 \pm 0.2	.8 \pm 0.3
10985	8077	B3890R584	0.0 - 1.0	< 3.7	< .8	1.2 \pm 0.8
			3.0 - 4.0	< 5.8	< 1.1	2.6 \pm 1.4
			7.0 - 8.0	< 4.5	< .7	< 1
10997	7727	B3890R514	0.0 - 1.0	< 3.4	.9 \pm 0.4	2.8 \pm 0.3
			1.0 - 2.0	< 4.3	1.1 \pm 0.1	3 \pm 0.2
			3.0 - 4.0	< 3.3	1.7 \pm 0.5	3.4 \pm 0.7
10998	7727	B3890R531	0.0 - 7.0	< 3.3	.9 \pm 0.3	3.3 \pm 0.7
			2.0 - 3.0	< 3.3	1.4 \pm 0.7	1.9 \pm 0.7
			6.0 - 7.0	< 2.3	< .5	.8 \pm 0.3
11000	7950	B3890R635	0.0 - 1.0	< 1.4	< .5	1 \pm 0.4
			3.0 - 4.0	3.6 \pm 3.5	1.1 \pm 0.4	2.9 \pm 0.5
			5.0 - 6.0	< 2.2	.5 \pm 0.2	.5 \pm 0.4

Table F-7
(continued)

Page 4 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
11000	7970	B3890R583	0.0 - 2.0	< 1.4	.4 \pm 0.3	1.6 \pm 0.4
11009	7734	B3890R518	0.0 - 1.0	< 3.8	< .7	3.9 \pm 0.2
			2.0 - 3.0	< 3.4	1.2 \pm 0.9	3.9 \pm 1.3
			3.0 - 4.0	< 2.9	1.4 \pm 0.3	1.4 \pm 0.1
			6.0 - 7.0	< 4.6	1.4 \pm 0.1	1.5 \pm 0.2
			7.0 - 8.0	< 2.7	1.1 \pm 0.3	1.2 \pm 0.3
11013	7747	B3890R532	0.0 - 1.0	< 5.5	1.6 \pm 0.4	5.8 \pm 0.7
			2.0 - 3.0	< 4.7	1.5 \pm 0.5	3.5 \pm 0.7
			7.0 - 8.0	< 4.3	.7 \pm 0.1	.6 \pm 0.2
11025	7950	B3890R585	0.0 - 1.0	< 2.6	.9 \pm 0.3	1.4 \pm 0.3
			4.0 - 5.0	1.9 \pm 1.7	.5 \pm 0.3	.6 \pm 0.1
			7.0 - 8.0	< 3.6	.7 \pm 0.3	.8 \pm 0.3
11028	8025	B3890R637	0.0 - 2.0	< 5.9	.5 \pm 0.4	1.3 \pm 0.6
			5.0 - 6.0	1.9 \pm 1.7	.8 \pm 0.3	.5 \pm 0.4
			9.0 - 10.0	< 1.9	.3 \pm 0.3	.8 \pm 0.3
11035	8040	B3890R586	0.0 - 1.0	< 4.9	< 1	2.4 \pm 0.9
			5.0 - 6.0	< 3.6	< .8	< 1
			9.0 - 10.0	< 4.8	< .8	< 1.5
11050	7950	B3890R525	0.0 - 1.0	< 3.3	1.3 \pm 0.5	1.3 \pm 0.9
			4.0 - 5.0	< 2.5	.6 \pm 0.5	.7 \pm 0.3
			8.0 - 10.0	< 3	< .6	< .9
11050	8000	B3890R520	0.0 - 1.0	< 4	1 \pm 0.4	.9 \pm 0.7
			4.0 - 5.0	< 6	.5 \pm 0.3	.6 \pm 0.5
			7.0 - 8.0	< 1.9	1 \pm 0.5	.7 \pm 0.6
11054	8051	B3890R517	0.0 - 1.0	< 5.6	.8 \pm 0.4	2.6 \pm 0.8
			4.0 - 5.0	< 3	.6 \pm 0.3	1 \pm 0.5
			7.0 - 8.0	< 5.9	1 \pm 0.5	1 \pm 0.7

Table F-8
Downhole Gamma Logging Results,
113 Essex Street

Page 1 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R572^d</u>			
10755	7903	0.5	6000
10755	7903	1.0	7000
10755	7903	1.5	13000
10755	7903	2.0	14000
10755	7903	2.5	12000
10755	7903	3.0	11000
10755	7903	3.5	11000
10755	7903	4.0	9000
10755	7903	4.5	8000
10755	7903	5.0	9000
10755	7903	5.5	9000
10755	7903	6.0	9000
10755	7903	6.5	10000
10755	7903	7.0	10000
10755	7903	7.5	10000
<u>Borehole B3890R528</u>			
10800	7850	0.5	5000
10800	7850	1.0	5000
10800	7850	1.5	6000
10800	7850	2.0	11000
10800	7850	2.5	16000
10800	7850	3.0	20000
10800	7850	3.5	16000
10800	7850	4.0	12000
10800	7850	4.5	11000
10800	7850	5.0	10000
10800	7850	5.5	10000
10800	7850	6.0	10000
10800	7850	6.5	10000
10800	7850	7.0	11000
10800	7850	7.5	12000
10800	7850	8.0	12000
<u>Borehole B3890R521^d</u>			
10850	7950	0.5	7000
10850	7950	1.0	12000
10850	7950	1.5	13000
10850	7950	2.0	13000
10850	7950	2.5	14000

Table F-8
(continued)

Page 2 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R521^d</u> (continued)			
10850	7950	3.0	13000
10850	7950	3.5	13000
10850	7950	4.0	15000
10850	7950	4.5	22000
10850	7950	5.0	17000
10850	7950	5.5	12000
10850	7950	6.0	11000
10850	7950	6.5	11000
10850	7950	7.0	10000
<u>Borehole B3890R535^d</u>			
10875	7735	0.5	17000
10875	7735	1.0	22000
10875	7735	1.5	18000
10875	7735	2.0	14000
10875	7735	2.5	12000
10875	7735	3.0	12000
10875	7735	3.5	18000
10875	7735	4.0	22000
10875	7735	4.5	20000
10875	7735	5.0	16000
10875	7735	5.5	12000
10875	7735	6.0	12000
10875	7735	6.5	11000
10875	7735	7.0	11000
<u>Borehole B3890R580^d</u>			
10920	8030	0.5	8000
10920	8030	1.0	13000
10920	8030	1.5	17000
10920	8030	2.0	19000
10920	8030	2.5	20000
10920	8030	3.0	25000
10920	8030	3.5	24000
10920	8030	4.0	16000
10920	8030	4.5	14000
10920	8030	5.0	19000
10920	8030	5.5	22000
10920	8030	6.0	20000
10920	8030	6.5	15000
10920	8030	7.0	14000
10920	8030	7.5	16000

Table F-8
(continued)

Page 3 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R629^d</u>			
10935	8027	0.5	9000
10935	8027	1.0	11000
10935	8027	1.5	18000
10935	8027	2.0	17000
10935	8027	2.5	19000
10935	8027	3.0	17000
10935	8027	3.5	20000
10935	8027	4.0	18000
10935	8027	4.5	17000
10935	8027	5.0	11000
10935	8027	5.5	17000
10935	8027	6.0	14000
10935	8027	6.5	10000
10935	8027	7.0	9000
10935	8027	7.5	8000
10935	8027	8.0	9000
10935	8027	8.5	9000
10935	8027	9.0	9000
<u>Borehole B3890R582^d</u>			
10938	8045	0.5	9000
10938	8045	1.0	15000
10938	8045	1.5	21000
10938	8045	2.0	24000
10938	8045	2.5	23000
10938	8045	3.0	21000
10938	8045	3.5	19000
10938	8045	4.0	19000
10938	8045	4.5	19000
10938	8045	5.0	15000
10938	8045	5.5	13000
10938	8045	6.0	13000
10938	8045	6.5	12000
10938	8045	7.0	12000
10938	8045	7.5	14000
<u>Borehole B3890R631^d</u>			
10942	7722	0.5	25000
10942	7722	1.0	35000
10942	7722	1.5	17000
10942	7722	2.0	12000
10942	7722	2.5	11000

Table F-8
(continued)

Page 4 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R631^d</u> (continued)			
10942	7722	3.0	11000
10942	7722	3.5	11000
10942	7722	4.0	12000
10942	7722	4.5	13000
10942	7722	5.0	14000
10942	7722	5.5	13000
10942	7722	6.0	10000
10942	7722	6.5	9000
10942	7722	7.0	8000
10942	7722	7.5	8000
10942	7722	8.0	9000
10942	7722	8.4	9000
<u>Borehole B3890R523^d</u>			
10950	7950	0.5	7000
10950	7950	1.0	12000
10950	7950	1.5	18000
10950	7950	2.0	19000
10950	7950	2.5	17000
10950	7950	3.0	20000
10950	7950	3.5	20000
10950	7950	4.0	26000
10950	7950	4.5	17000
10950	7950	5.0	15000
10950	7950	5.5	15000
10950	7950	6.0	17000
<u>Borehole B3890R581^d</u>			
10950	7980	0.5	6000
10950	7980	1.0	11000
10950	7980	1.5	12000
10950	7980	2.0	13000
10950	7980	2.5	14000
10950	7980	3.0	17000
10950	7980	3.5	20000
10950	7980	4.0	19000
10950	7980	4.5	19000
10950	7980	5.0	19000
10950	7980	5.5	19000
10950	7980	6.0	15000

Table F-8
(continued)

Page 5 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R581^d (continued)

10950	7980	6.5	12000
10950	7980	7.0	10000
10950	7980	7.5	9000
10950	7980	8.0	8000
10950	7980	8.5	8000
10950	7980	9.0	8000
10950	7980	9.5	10000

Borehole B3890R632

10950	8000	0.5	7000
10950	8000	1.0	13000
10950	8000	1.5	15000
10950	8000	2.0	23000
10950	8000	2.5	22000
10950	8000	3.0	19000
10950	8000	3.5	18000
10950	8000	4.0	18000
10950	8000	4.5	17000
10950	8000	5.0	12000
10950	8000	5.5	11000
10950	8000	6.0	10000
10950	8000	6.5	9000
10950	8000	7.0	9000
10950	8000	7.5	8000
10950	8000	8.0	8000

Borehole B3890R577^d

10950	8025	0.5	5000
10950	8025	1.0	6000
10950	8025	1.5	10000
10950	8025	2.0	16000
10950	8025	2.5	16000
10950	8025	3.0	13000
10950	8025	3.5	30000
10950	8025	4.0	30000
10950	8025	4.5	27000
10950	8025	5.0	17000
10950	8025	5.5	13000
10950	8025	6.0	10000

Table F-8
(continued)

Page 6 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R577^d</u> (continued)			
10950	8025	6.5	8000
10950	8025	7.0	8000
10950	8025	7.5	7000
10950	8025	8.0	8000
<u>Borehole B3890R524^d</u>			
10950	8050	0.5	7000
10950	8050	1.0	11000
10950	8050	1.5	18000
10950	8050	2.0	18000
10950	8050	2.5	19000
10950	8050	3.0	22000
10950	8050	3.5	18000
10950	8050	4.0	16000
10950	8050	4.5	15000
10950	8050	5.0	13000
10950	8050	5.5	12000
10950	8050	6.0	12000
10950	8050	6.5	12000
10950	8050	7.0	12000
10950	8050	7.5	11000
<u>Borehole B3890R625^d</u>			
10953	7726	0.5	21000
10953	7726	1.0	25000
10953	7726	1.5	25000
10953	7726	2.0	28000
10953	7726	2.5	31000
10953	7726	3.0	31000
10953	7726	3.5	33000
10953	7726	4.0	39000
10953	7726	4.5	46000
10953	7726	5.0	51000
10953	7726	5.5	50000
10953	7726	6.0	42000
10953	7726	6.5	39000
10953	7726	7.0	16000
10953	7726	7.5	11000
10953	7726	8.0	10000
10953	7726	8.5	10000
10953	7726	9.0	10000

Table F-8
(continued)

Page 7 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R579^d</u>			
10960	8025	0.5	7000
10960	8025	1.0	11000
10960	8025	1.5	21000
10960	8025	2.0	17000
10960	8025	2.5	12000
10960	8025	3.0	13000
10960	8025	3.5	23000
10960	8025	4.0	25000
10960	8025	4.5	18000
10960	8025	5.0	13000
10960	8025	5.5	13000
10960	8025	6.0	13000
10960	8025	6.5	12000
10960	8025	7.0	11000
<u>Borehole B3890R624^d</u>			
10969	7735	0.5	17000
10969	7735	1.0	25000
10969	7735	1.5	22000
10969	7735	2.0	19000
10969	7735	2.5	20000
10969	7735	3.0	23000
10969	7735	3.5	27000
10969	7735	4.0	25000
10969	7735	4.5	23000
10969	7735	5.0	27000
10969	7735	5.5	42000
10969	7735	6.0	57000
10969	7735	6.5	60000
10969	7735	7.0	83000
10969	7735	7.5	38000
10969	7735	8.0	27000
10969	7735	8.5	23000
10969	7735	9.0	19000
10969	7735	9.5	13000
10969	7735	10.0	9000
<u>Borehole B3890R578^d</u>			
10970	8050	0.5	9000
10970	8050	1.0	8000
10970	8050	1.5	7000
10970	8050	2.0	9000

Table F-8
(continued)

Page 8 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R578^d (continued)

10970	8050	2.5	9000
10970	8050	3.0	10000
10970	8050	3.5	9000
10970	8050	4.0	8000
10970	8050	4.5	7000
10970	8050	5.0	7000
10970	8050	5.5	7000
10970	8050	6.0	7000
10970	8050	6.5	7000
10970	8050	7.0	7000
10970	8050	7.5	7000
10970	8050	8.0	7000

Borehole B3890R634

10975	7910	0.5	11000
10975	7910	1.0	15000
10975	7910	1.5	15000
10975	7910	2.0	15000
10975	7910	2.5	14000
10975	7910	3.0	15000
10975	7910	3.5	15000
10975	7910	4.0	14000
10975	7910	4.5	12000
10975	7910	5.0	11000
10975	7910	5.5	11000
10975	7910	6.0	10000
10975	7910	6.5	11000
10975	7910	7.0	11000
10975	7910	7.5	11000
10975	7910	8.0	11000
10975	7910	8.5	11000
10975	7910	9.0	10000
10975	7910	9.5	8000
10975	7910	10.0	8000
10975	7910	10.5	11000
10975	7910	11.0	11000
10975	7910	11.5	13000
10975	7910	12.0	13000

Table F-8
(continued)

Page 9 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R526^d</u>			
10975	8025	0.5	7000
10975	8025	1.0	6000
10975	8025	1.5	13000
10975	8025	2.0	14000
10975	8025	2.5	14000
10975	8025	3.0	15000
10975	8025	3.5	14000
10975	8025	4.0	14000
10975	8025	4.5	14000
10975	8025	5.0	14000
10975	8025	5.5	15000
10975	8025	6.0	13000
10975	8025	6.5	14000
10975	8025	7.0	12000
10975	8025	7.5	11000
<u>Borehole B3890R522^d</u>			
10983	7715	0.5	18000
10983	7715	1.0	25000
10983	7715	1.5	17000
10983	7715	2.0	17000
10983	7715	2.5	16000
10983	7715	3.0	17000
10983	7715	3.5	17000
10983	7715	4.0	15000
10983	7715	4.5	13000
10983	7715	5.0	13000
10983	7715	5.5	12000
10983	7715	6.0	10000
<u>Borehole B3890R633</u>			
10985	7905	0.5	15000
10985	7905	1.0	17000
10985	7905	1.5	19000
10985	7905	2.0	20000
10985	7905	2.5	20000
10985	7905	3.0	18000
10985	7905	3.5	16000
10985	7905	4.0	14000
10985	7905	4.5	13000
10985	7905	5.0	12000

Table F-8
(continued)

Page 10 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R633 (continued)</u>			
10985	7905	5.5	12000
10985	7905	6.0	13000
10985	7905	6.5	14000
10985	7905	7.0	21000
10985	7905	7.5	40000
10985	7905	8.0	48000
10985	7905	8.5	24000
10985	7905	9.0	15000
10985	7905	9.5	15000
10985	7905	10.0	15000
10985	7905	10.5	15000
10985	7905	11.0	15000
<u>Borehole B3890R584^d</u>			
10985	8077	0.5	8000
10985	8077	1.0	13000
10985	8077	1.5	14000
10985	8077	2.0	13000
10985	8077	2.5	15000
10985	8077	3.0	17000
10985	8077	3.5	16000
10985	8077	4.0	15000
10985	8077	4.5	13000
10985	8077	5.0	13000
10985	8077	5.5	13000
10985	8077	6.0	12000
10985	8077	6.5	12000
10985	8077	7.0	12000
10985	8077	7.5	13000
<u>Borehole B3890R514^d</u>			
10997	7727	0.5	21000
10997	7727	1.0	24000
10997	7727	1.5	35000
10997	7727	2.0	29000
10997	7727	2.5	26000
10997	7727	3.0	35000

Table F-8
(continued)

Page 11 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R531</u>			
10998	7727	0.5	11000
10998	7727	1.0	16000
10998	7727	1.5	26000
10998	7727	2.0	33000
10998	7727	2.5	32000
10998	7727	3.0	24000
10998	7727	3.5	26000
10998	7727	4.0	10000
10998	7727	4.5	9000
10998	7727	5.0	9000
10998	7727	5.5	10000
10998	7727	6.0	12000
10998	7727	6.5	11000
10998	7727	7.0	10000
<u>Borehole B3890R635^d</u>			
11000	7950	0.5	9000
11000	7950	1.0	13000
11000	7950	1.5	14000
11000	7950	2.0	15000
11000	7950	2.5	12000
11000	7950	3.0	14000
11000	7950	3.5	17000
11000	7950	4.0	16000
11000	7950	4.5	16000
11000	7950	5.0	16000
11000	7950	5.5	17000
11000	7950	6.0	18000
11000	7950	6.5	14000
<u>Borehole B3890R636</u>			
11000	7955	0.5	9000
11000	7955	1.0	10000
11000	7955	1.5	9000
11000	7955	2.0	10000
11000	7955	2.5	10000
11000	7955	3.0	11000
11000	7955	3.5	12000
11000	7955	4.0	10000
11000	7955	4.5	12000
11000	7955	5.0	15000
11000	7955	5.5	15000
11000	7955	6.0	15000

Table F-8
(continued)

Page 12 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R583</u>			
11000	7970	0.5	8000
11000	7970	1.0	14000
11000	7970	1.5	15000
11000	7970	2.0	16000
11000	7970	2.5	17000
11000	7970	3.0	19000
11000	7970	3.5	16000
11000	7970	4.0	14000
11000	7970	4.5	12000
11000	7970	5.0	13000
<u>Borehole B3890R518^d</u>			
11009	7734	0.5	18000
11009	7734	1.0	31000
11009	7734	1.5	31000
11009	7734	2.0	28000
11009	7734	2.5	24000
11009	7734	3.0	21000
11009	7734	3.5	14000
11009	7734	4.0	8000
11009	7734	4.5	14000
11009	7734	5.0	22000
11009	7734	5.5	30000
11009	7734	6.0	19000
<u>Borehole B3890C630</u>			
11010	8080	0.5	7000
11010	8080	1.0	9000
11010	8080	1.5	13000
11010	8080	2.0	15000
11010	8080	2.5	15000
11010	8080	3.0	16000
11010	8080	3.5	14000
11010	8080	4.0	14000
11010	8080	4.5	12000
11010	8080	5.0	13000
11010	8080	5.5	12000
11010	8080	6.0	12000
11010	8080	6.5	11000
11010	8080	7.0	11000

Table F-8
(continued)

Page 13 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890C630 (continued)</u>			
11010	8080	7.5	11000
11010	8080	8.0	10000
11010	8080	8.5	11000
11010	8080	9.0	11000
11010	8080	9.5	12000
11010	8080	10.0	11000
11010	8080	10.5	11000
11010	8080	11.0	10000
<u>Borehole B3890R532^d</u>			
11013	7747	0.5	17000
11013	7747	1.0	30000
11013	7747	1.5	42000
11013	7747	2.0	31000
11013	7747	2.5	23000
11013	7747	3.0	21000
11013	7747	3.5	13000
11013	7747	4.0	10000
11013	7747	4.5	11000
11013	7747	5.0	20000
11013	7747	5.5	53000
11013	7747	6.0	20000
11013	7747	6.5	14000
<u>Borehole B3890R585^d</u>			
11025	7950	0.5	8000
11025	7950	1.0	14000
11025	7950	1.5	18000
11025	7950	2.0	19000
11025	7950	2.5	18000
11025	7950	3.0	13000
11025	7950	3.5	9000
11025	7950	4.0	9000
11025	7950	4.5	9000
11025	7950	5.0	9000
11025	7950	5.5	9000
11025	7950	6.0	11000
11025	7950	6.5	12000
11025	7950	7.0	13000

Table F-8
(continued)

Page 14 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R637</u>			
11028	8025	0.5	6000
11028	8025	1.0	7000
11028	8025	1.5	9000
11028	8025	2.0	8000
11028	8025	2.5	7000
11028	8025	3.0	6000
11028	8025	3.5	7000
11028	8025	4.0	8000
11028	8025	4.5	9000
11028	8025	5.0	9000
11028	8025	5.5	9000
11028	8025	6.0	9000
11028	8025	6.5	8000
11028	8025	7.0	7000
11028	8025	7.5	7000
11028	8025	8.0	7000
11028	8025	8.5	8000
11028	8025	9.0	9000
11028	8025	9.5	10000
11028	8025	10.0	10000
11028	8025	10.5	10000
<u>Borehole B3890R586</u>			
11035	8040	0.5	7000
11035	8040	1.0	10000
11035	8040	1.5	14000
11035	8040	2.0	14000
11035	8040	2.5	12000
11035	8040	3.0	13000
11035	8040	3.5	12000
11035	8040	4.0	11000
11035	8040	4.5	11000
11035	8040	5.0	10000
11035	8040	5.5	9000
11035	8040	6.0	10000
11035	8040	6.5	11000
11035	8040	7.0	11000
11035	8040	7.5	11000
11035	8040	8.0	10000
11035	8040	8.5	11000
11035	8040	9.0	11000
11035	8040	9.5	11000
11035	8040	10.0	13000

Table F-8
(continued)

Page 15 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R529</u>			
11045	7950	0.5	9000
11045	7950	1.0	14000
11045	7950	1.5	14000
11045	7950	2.0	9000
11045	7950	2.5	9000
11045	7950	3.0	9000
11045	7950	3.5	9000
11045	7950	4.0	9000
11045	7950	4.5	10000
11045	7950	5.0	10000
11045	7950	5.5	11000
11045	7950	6.0	12000
11045	7950	6.5	9000
11045	7950	7.0	9000
11045	7950	7.5	9000
11045	7950	8.0	11000
11045	7950	8.5	11000
<u>Borehole B3890R525^d</u>			
11050	7950	1.0	14000
11050	7950	1.5	10000
11050	7950	2.0	11000
11050	7950	2.5	11000
11050	7950	3.0	10000
<u>Borehole B3890R520^d</u>			
11050	8000	0.5	7000
11050	8000	1.0	9000
11050	8000	1.5	10000
11050	8000	2.0	6000
11050	8000	2.5	8000
11050	8000	3.0	8000
11050	8000	3.5	8000
11050	8000	4.0	8000
11050	8000	4.5	8000
11050	8000	5.0	8000

Table F-8
(continued)

Page 16 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R517^d</u>			
11054	8051	0.5	14000
11054	8051	1.0	17000
11054	8051	1.5	16000
11054	8051	2.0	13000
11054	8051	2.5	10000
11054	8051	3.0	11000
11054	8051	3.5	11000
11054	8051	4.0	11000
11054	8051	4.5	11000
11054	8051	5.0	11000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table F-9
Gamma Radiation Exposure Rates,
113 Essex Street

<u>Coordinates^a</u>		<u>Rate^b</u> (μ R/h)
East	North	
10770	7740	5
10770	7920	5
10900	7950	6
10920	7730	10
10940	8050	6
10970	7730	13
11010	7740	17
11020	8050	6
11080	7980	6

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table F-10
Surface and Subsurface Radionuclide Concentrations in Soil,
Interstate 80 (Westbound Right-of-Way)

Page 1 of 4

<u>Coordinates</u>		<u>Borehole No.</u>	<u>Depth (ft)</u>	<u>Concentration (pCi/g \pm 2 sigma)</u>		
<u>East</u>	<u>North</u>			<u>Uranium-238</u>	<u>Radium-226</u>	<u>Thorium-232</u>
Surface						
3929	2383		0.0 - 0.5	< 2.5	< .6	< .8
3930	2395		0.0 - 0.5	< 2.9	< .6	< .8
3934	2409		0.0 - 0.5	< 4.6	< .8	3.3 \pm 0.5
Subsurface						
3832	2022	B3890R423	0.0 - 1.0	< 8.4	.9 \pm 0.1	2.5 \pm 0.2
			6.0 - 7.0	< 6.3	.4 \pm 0.1	.7 \pm 0.2
			14.0 - 16.0	< 10	.6 \pm 0.2	1.6 \pm 0.7
3837	2042	B3890R424	0.0 - 1.0	< 7.8	.7 \pm 0.2	.8 \pm 0.2
			4.0 - 5.0	< 4.8	< .5	1 \pm 0.4
			7.0 - 8.0	< 4.1	< .4	< .7
3841	2062	B3890R425	0.0 - 2.0	< 9.3	< 1	< 1.6
			5.0 - 6.0	< 4.4	.5 \pm 0.4	< .8
3929	2383	HA125	1.5 - 2.0	< 3.6	< .8	< 1.2
			2.5 - 3.0	< 1.4	< .4	< .4
3930	2395	HA124	0.5 - 1.0	< 2.5	< .5	< .9
3934	2409	HA123	1.5 - 2.0	< 3.3	< .7	1.5 \pm 0.7
3950	2433	B3890R421	0.0 - 1.0	< 7.4	< .8	1.5 \pm 0.5
			7.0 - 8.0	< 4	< .6	< .7
			13.0 - 14.0	< 3.9	< .5	< .7
3950	2448	B3890R409	0.0 - 1.0	< 5.2	< .8	< 1.2
			4.0 - 5.0	< 5.8	1.1 \pm 0.7	2.4 \pm 0.5
			9.0 - 10.0	< 3	< .6	< .7
3964	2417	B3890R422	0.0 - 1.0	< 10.5	< 1.1	5.2 \pm 1.2
			2.0 - 3.0	< 4.4	< 1	4.7 \pm 1.6
			3.0 - 4.0	< 4.6	1.6 \pm 0.5	4.6 \pm 1.0
			5.0 - 6.0	< 2.3	< .8	< 1

Table F-10
(continued)

Page 2 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
3969	2448	B3890R420	0.0 - 1.0	< 8.4	< .9	3.4 \pm 1.4
			5.0 - 6.0	< 5.4	< .8	1.1 \pm 0.1
			8.0 - 10.0	< 7.2	< .8	< 1
3970	2427	B3890R419	0.0 - 2.0	< 10.6	.9 \pm 0.3	5.2 \pm 1.5
			2.0 - 4.0	< 7.5	< .8	3.7 \pm 0.6
			8.0 - 10.0	< 4	< .5	.8 \pm 1.0
3970	2438	B3890R418	0.0 - 1.0	< 9.3	1.5 \pm 0.9	4.1 \pm 0.3
			2.0 - 3.0	< 7.7	.9 \pm 0.2	3.3 \pm 0.4
			3.0 - 4.0	< 7.1	< .9	2.3 \pm 0.1
			7.0 - 8.0	< 6.2	< .8	< .9
3974	2360	B3890R403	0.0 - 1.0	< 2.8	.6 \pm 0.3	2.4 \pm 0.5
			5.0 - 6.0	< 1.6	.7 \pm 0.2	.9 \pm 0.3
			9.0 - 10.0	< 1.7	.7 \pm 0.2	.9 \pm 0.4
3985	2402	B3890R398	0.0 - 1.0	< 2.1	1.2 \pm 0.4	2.5 \pm 0.7
			5.0 - 6.0	< 2	.5 \pm 0.2	1 \pm 0.4
			10.0 - 12.0	< 3.2	.8 \pm 0.3	.6 \pm 0.3
3987	2426	B3890R399	0.0 - 2.0	< 2.9	1 \pm 0.6	6 \pm 1.0
			6.0 - 7.0	< 1.6	< .3	1 \pm 0.5
			10.0 - 11.5	< 1.9	.5 \pm 0.3	.7 \pm 0.3
3990	2440	B3890R417	0.0 - 2.0	< 6.1	< .7	2.3 \pm 1.2
			6.0 - 7.0	< 9.1	< 1.2	< 1.4
			9.0 - 10.0	< 4.1	< .5	< .6
3992	2450	B3890R400	0.0 - 2.0	< 5.1	1.2 \pm 0.4	1.7 \pm 0.6
			6.0 - 7.0	< 1.5	.6 \pm 0.3	.5 \pm 0.4
			11.0 - 12.0	< 1.9	.4 \pm 0.2	.4 \pm 0.3
4009	2350	B3890R404	0.0 - 1.0	< 1.6	.6 \pm 0.3	1.1 \pm 0.2
			4.0 - 5.0	< 2.3	.6 \pm 0.1	.7 \pm 0.1
			7.0 - 8.0	< 3.9	.7 \pm 0.3	.9 \pm 0.2
			8.0 - 10.0	1.7 \pm 1.5	.4 \pm 0.3	.9 \pm 0.2
4012	2505	B3890R401	0.0 - 1.0	< 2.3	.5 \pm 0.3	1 \pm 0.4
			5.0 - 6.0	< 3.7	.7 \pm 0.2	.7 \pm 0.4
			9.0 - 10.0	< 1.6	.5 \pm 0.3	.9 \pm 0.4
4013	2362	B3890R402	0.0 - 2.0	< 1.6	.4 \pm 0.2	.6 \pm 0.3
			2.0 - 3.0	< 4	.5 \pm 0.3	1.2 \pm 0.4
			3.0 - 4.0	< 2.4	.8 \pm 0.5	4.6 \pm 0.7
			10.0 - 12.0	< 2.1	.5 \pm 0.2	1.6 \pm 0.3

Table F-10
(continued)

Page 3 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
4016	2435	B3890R415	0.0 - 1.0	< 6.3	< 1.2	3.7 \pm 1.4
			3.0 - 4.0	< 8.9	1 \pm 0.1	1.5 \pm 0.3
			7.0 - 8.0	< 5.1	.4 \pm 0.1	.6 \pm 0.1
4021	2370	B3890R405	0.0 - 2.0	< 3.2	.8 \pm 0.3	1.6 \pm 0.4
4035	2411	B3890R406	0.0 - 1.0	< 4.4	< 1.1	2.2 \pm 0.7
			2.0 - 4.0	< 3.5	< .8	< 1.3
			4.0 - 5.0	< 9.1	1.1 \pm 0.2	3.7 \pm 0.2
			5.0 - 6.0	< 2.4	< .6	< .8
			7.0 - 8.0	< 2.2	< .7	.8 \pm 0.6
4052	2667	B3890R413	0.0 - 1.0	< 4.1	.7 \pm 0.6	.8 \pm 0.2
			4.0 - 5.0	< 3.1	< .6	< .8
			10.0 - 12.0	< 9.3	1 \pm 0.2	1.5 \pm 0.6
4058	2492	B3890R438	0.0 - 1.0	< 3.1	.7 \pm 0.3	1 \pm 0.4
			3.0 - 4.0	< 2	.9 \pm 0.3	1.1 \pm 0.5
			7.0 - 8.0	< 4.4	.4 \pm 0.2	.8 \pm 0.5
4077	2440	B3890R414	0.0 - 1.0	< 4.8	.9 \pm 0.4	2.5 \pm 1.8
			1.0 - 2.0	< 5	< .9	< 1.5
			2.0 - 3.0	< 4.5	.8 \pm 0.2	1.7 \pm 1.1
			3.0 - 4.0	< 4.7	< .8	2.6 \pm 0.9
			4.0 - 5.0	< 4.7	< .9	1.7 \pm 0.7
			5.0 - 6.0	< 2.7	.8 \pm 0.2	< .8
4119	2524	B3890R407	0.0 - 1.0	< 5.3	< .9	< 1.6
			5.0 - 6.0	< 4	< .8	1.2 \pm 0.7
			9.0 - 10.0	< 4.3	< .8	< 1.1
4125	2635	B3890R408	0.0 - 1.0	< 6.7	.7 \pm 0.3	.5 \pm 0.3
			4.0 - 5.0	< 3.8	< .7	< 1.1
			9.0 - 10.0	< 4.4	< .8	< 1.4
4128	2931	B3890R412	0.0 - 2.0	< 6	< 1.1	< 1.5
			5.0 - 6.0	< 3.9	< .6	1.1 \pm 0.1
			9.0 - 10.0	< 5.3	< .9	< 1.1
4129	2740	B3890R410	0.0 - 2.0	< 3.8	< .6	< .9
			4.0 - 5.0	< 6.7	.6 \pm 0.2	.9 \pm 0.2
			9.0 - 10.0	< 4.3	< .7	1.2 \pm 0.4
4129	2827	B3890R411	0.0 - 1.0	< 3.8	< .5	< .9
			4.0 - 5.0	< 8.6	7.3 \pm 0.2	1.3 \pm 0.8
			7.0 - 8.0	< 6	< .9	< 1.5

Table F-10
(continued)

Page 4 of 4

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm 2 sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
4158	2656	B3890R439	0.0 - 1.0	< 2.6	.6 \pm 0.1	< .9
			4.0 - 5.0	< 5.8	.6 \pm 0.1	.7 \pm 0.4
			8.0 - 9.0	< 2.1	< .5	.8 \pm 0.3

Table F-11
Downhole Gamma Logging Results,
Interstate 80 (Westbound Right-of-Way)

Page 1 of 15

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R423^d</u>			
3832	2022	0.5	13000
3832	2022	1.0	13000
3832	2022	1.5	11000
3832	2022	2.0	10000
3832	2022	2.5	11000
3832	2022	3.0	11000
3832	2022	3.5	11000
3832	2022	4.0	11000
3832	2022	4.5	11000
3832	2022	5.0	10000
3832	2022	5.5	9000
3832	2022	6.0	9000
3832	2022	6.5	9000
3832	2022	7.0	9000
3832	2022	7.5	9000
3832	2022	8.0	9000
3832	2022	8.5	9000
3832	2022	9.0	8000
3832	2022	9.5	8000
3832	2022	10.0	8000
3832	2022	10.5	8000
3832	2022	11.0	8000
3832	2022	11.5	8000
3832	2022	12.0	8000
3832	2022	12.5	8000
3832	2022	13.0	8000
3832	2022	13.5	8000
3832	2022	14.0	8000
<u>Borehole B3890R424</u>			
3837	2042	0.5	11000
3837	2042	1.0	10000
3837	2042	1.5	9000
3837	2042	2.0	9000
3837	2042	2.5	9000
3837	2042	3.0	9000
3837	2042	3.5	10000
3837	2042	4.0	10000
3837	2042	4.5	9000
3837	2042	5.0	9000

Table F-11
(continued)

Page 2 of 15

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R424 (continued)</u>			
3837	2042	5.5	8000
3837	2042	6.0	7000
3837	2042	6.5	8000
3837	2042	7.0	8000
3837	2042	7.5	8000
3837	2042	8.0	8000
<u>Borehole B3890R425</u>			
3841	2062	0.5	7000
3841	2062	1.0	8000
3841	2062	1.5	6000
3841	2062	2.0	8000
3841	2062	2.5	7000
3841	2062	3.0	11000
3841	2062	3.5	12000
3841	2062	4.0	11000
3841	2062	4.5	9000
3841	2062	5.0	8000
3841	2062	5.5	9000
3841	2062	6.0	8000
<u>Borehole HA-125</u>			
3929	2383	0.5	5000
3929	2383	1.0	6000
3929	2383	1.5	6000
3929	2383	2.0	6000
3929	2383	2.5	6000
3929	2383	3.0	6000
<u>Borehole HA-124</u>			
3930	2395	0.5	4000
3930	2395	1.0	5000
<u>Borehole HA-123</u>			
3934	2409	0.5	9000
3934	2409	1.0	7000
3934	2409	1.5	7000
3934	2409	2.0	7000

Table F-11
(continued)

Page 3 of 15

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R421^d</u>			
3950	2433	0.5	11000
3950	2433	1.0	16000
3950	2433	1.5	17000
3950	2433	2.0	16000
3950	2433	2.5	13950
3950	2433	3.0	13000
3950	2433	3.5	13950
3950	2433	4.0	16000
3950	2433	4.5	21000
3950	2433	5.0	29000
3950	2433	5.5	31000
3950	2433	6.0	18000
3950	2433	6.5	11000
3950	2433	7.0	9000
3950	2433	7.5	9000
3950	2433	8.0	9000
3950	2433	8.5	9000
3950	2433	9.0	9000
3950	2433	9.5	9000
3950	2433	10.0	8000
3950	2433	10.5	7000
3950	2433	11.0	7000
3950	2433	11.5	7000
3950	2433	12.0	8000
3950	2433	12.5	8000
3950	2433	13.0	9000
3950	2433	13.5	9000
3950	2433	14.0	10000
3950	2433	14.5	10000
<u>Borehole B3890R409</u>			
3950	2448	0.5	11000
3950	2448	1.0	13000
3950	2448	1.5	12000
3950	2448	2.0	11000
3950	2448	2.5	13000
3950	2448	3.0	13000
3950	2448	3.5	16000
3950	2448	4.0	18000
3950	2448	4.5	22000
3950	2448	5.0	21000
3950	2448	5.5	15000

Table F-11
(continued)

Page 4 of 15

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R409 (continued)</u>			
3950	2448	6.0	12000
3950	2448	6.5	9000
3950	2448	7.0	8000
3950	2448	7.5	8000
3950	2448	8.0	8000
3950	2448	8.5	7000
3950	2448	9.0	7000
3950	2448	9.5	6000
3950	2448	10.0	6000
<u>Borehole B3890R422</u>			
3964	2417	0.5	27000
3964	2417	1.0	33000
3964	2417	1.5	41000
3964	2417	2.0	43000
3964	2417	2.5	36000
3964	2417	3.0	33000
3964	2417	3.5	29000
3964	2417	4.0	24000
3964	2417	4.5	16000
3964	2417	5.0	13000
3964	2417	5.5	10000
3964	2417	6.0	8000
<u>Borehole B3890R420^d</u>			
3969	2448	0.5	20000
3969	2448	1.0	19000
3969	2448	1.5	24000
3969	2448	2.0	30000
3969	2448	2.5	28000
3969	2448	3.0	26000
3969	2448	3.5	19000
3969	2448	4.0	17000
3969	2448	4.5	14000
3969	2448	5.0	12000
3969	2448	5.5	11000
3969	2448	6.0	10000
3969	2448	6.5	10000
3969	2448	7.0	11000
3969	2448	7.5	11000

Table F-11
(continued)

Page 5 of 15

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R420^d</u> (continued)			
3969	2448	8.0	11000
3969	2448	8.5	11000
3969	2448	9.0	11000
<u>Borehole B3890R419^d</u>			
3970	2427	0.5	19000
3970	2427	1.0	28000
3970	2427	1.5	33000
3970	2427	2.0	35000
3970	2427	2.5	34000
3970	2427	3.0	31000
3970	2427	3.5	30000
3970	2427	4.0	24000
3970	2427	4.5	22000
3970	2427	5.0	18000
3970	2427	5.5	14000
3970	2427	6.0	13000
3970	2427	6.5	12000
3970	2427	7.0	11000
3970	2427	7.5	10000
3970	2427	8.0	11000
3970	2427	8.5	11000
3970	2427	9.0	11000
3970	2427	9.5	11000
<u>Borehole B3890R418</u>			
3970	2438	0.5	21000
3970	2438	1.0	26000
3970	2438	1.5	26000
3970	2438	2.0	30000
3970	2438	2.5	34000
3970	2438	3.0	33000
3970	2438	3.5	29000
3970	2438	4.0	21000
3970	2438	4.5	22000
3970	2438	5.0	17000
3970	2438	5.5	16000
3970	2438	6.0	14000
3970	2438	6.5	13000

Table F-11
(continued)

Page 6 of 15

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R418 (continued)</u>			
3970	2438	7.0	12000
3970	2438	7.5	11000
3970	2438	8.0	11000
3970	2438	8.5	11000
<u>Borehole B3890R403</u>			
3974	2360	0.5	9000
3974	2360	1.0	19000
3974	2360	1.5	23000
3974	2360	2.0	22000
3974	2360	2.5	20000
3974	2360	3.0	19000
3974	2360	3.5	19000
3974	2360	4.0	13000
3974	2360	4.5	13000
3974	2360	5.0	13000
3974	2360	5.5	12000
3974	2360	6.0	12000
3974	2360	6.5	12000
3974	2360	7.0	12000
3974	2360	7.5	12000
3974	2360	8.0	12000
3974	2360	8.5	11000
3974	2360	9.0	11000
3974	2360	9.5	11000
3974	2360	10.0	11000
<u>Borehole B3890R398</u>			
3985	2402	0.5	16000
3985	2402	1.0	19000
3985	2402	1.5	16000
3985	2402	2.0	22000
3985	2402	2.5	22000
3985	2402	3.0	16000
3985	2402	3.5	14000
3985	2402	4.0	12000
3985	2402	4.5	12000
3985	2402	5.0	11000
3985	2402	5.5	11000
3985	2402	6.0	11000
3985	2402	6.5	12000

Table F-11
(continued)

Page 7 of 15

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R398 (continued)</u>			
3985	2402	7.0	12000
3985	2402	7.5	13000
3985	2402	8.0	13000
3985	2402	8.5	12000
3985	2402	9.0	12000
3985	2402	9.5	11000
3985	2402	10.0	11000
3985	2402	10.5	11000
3985	2402	11.0	11000
<u>Borehole B3890R399^d</u>			
3987	2426	0.5	29000
3987	2426	1.0	47000
3987	2426	1.5	33000
3987	2426	2.0	25000
3987	2426	2.5	25000
3987	2426	3.0	22000
3987	2426	3.5	19000
3987	2426	4.0	21000
3987	2426	4.5	14000
3987	2426	5.0	13000
3987	2426	5.5	12000
3987	2426	6.0	13000
3987	2426	6.5	11000
3987	2426	7.0	12000
3987	2426	7.5	12000
3987	2426	8.0	12000
3987	2426	8.5	11000
3987	2426	9.0	11000
3987	2426	9.5	11000
3987	2426	10.0	11000
3987	2426	10.5	10000
<u>Borehole B3890R417^d</u>			
3990	2440	0.5	12000
3990	2440	1.0	13990
3990	2440	1.5	16000
3990	2440	2.0	16000
3990	2440	2.5	15000
3990	2440	3.0	13000
3990	2440	3.5	13000

Table F-11
(continued)

Page 8 of 15

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R417^d</u> (continued)			
3990	2440	4.0	12000
3990	2440	4.5	12000
3990	2440	5.0	8000
3990	2440	5.5	7000
3990	2440	6.0	6000
3990	2440	6.5	6000
3990	2440	7.0	6000
3990	2440	7.5	6000
3990	2440	8.0	5000
3990	2440	8.5	5000
3990	2440	9.0	5000
3990	2440	9.5	5000
<u>Borehole B3890R400^d</u>			
3992	2450	0.5	11000
3992	2450	1.0	14000
3992	2450	1.5	16000
3992	2450	2.0	16000
3992	2450	2.5	15000
3992	2450	3.0	16000
3992	2450	3.5	21000
3992	2450	4.0	19000
3992	2450	4.5	13000
3992	2450	5.0	11000
3992	2450	5.5	10000
3992	2450	6.0	9000
3992	2450	6.5	9000
3992	2450	7.0	8000
3992	2450	7.5	6000
3992	2450	8.0	7000
3992	2450	8.5	11000
3992	2450	9.0	12000
3992	2450	9.5	10000
3992	2450	10.0	10000
3992	2450	10.5	11000
3992	2450	11.0	10000
3992	2450	11.5	10000
<u>Borehole B3890R404^d</u>			
4009	2350	0.5	6000
4009	2350	1.0	9000
4009	2350	1.5	11000

Table F-11
(continued)

Page 9 of 15

<u>Coordinates^a</u>		<u>Depth^b</u>	<u>Count Rate^c</u>
East	North	(ft)	(cpm)
<u>Borehole B3890R404^d</u> (continued)			
4009	2350	2.0	12000
4009	2350	2.5	14000
4009	2350	3.0	14000
4009	2350	3.5	12000
4009	2350	4.0	12000
4009	2350	4.5	10000
4009	2350	5.0	9000
4009	2350	5.5	9000
4009	2350	6.0	9000
4009	2350	6.5	10000
4009	2350	7.0	11000
4009	2350	7.5	12000
4009	2350	8.0	12000
4009	2350	8.5	12000
<u>Borehole B3890R401^d</u>			
4012	2505	0.5	8000
4012	2505	1.0	10000
4012	2505	1.5	10000
4012	2505	2.0	11000
4012	2505	2.5	10000
4012	2505	3.0	11000
4012	2505	3.5	12000
4012	2505	4.0	12000
4012	2505	4.5	11000
4012	2505	5.0	10000
4012	2505	5.5	11000
4012	2505	6.0	9000
4012	2505	6.5	10000
4012	2505	7.0	10000
4012	2505	7.5	10000
4012	2505	8.0	10000
4012	2505	8.5	10000
4012	2505	9.0	10000
4012	2505	9.5	9000
<u>Borehole B3890R402^d</u>			
4013	2362	0.5	6000
4013	2362	1.0	9000
4013	2362	1.5	13000
4013	2362	2.0	16000

Table F-11
(continued)

Page 10 of 15

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R402^d</u> (continued)			
4013	2362	2.5	18000
4013	2362	3.0	26000
4013	2362	3.5	36000
4013	2362	4.0	40000
4013	2362	4.5	30000
4013	2362	5.0	24000
4013	2362	5.5	16000
4013	2362	6.0	11000
4013	2362	6.5	10000
4013	2362	7.0	12000
4013	2362	7.5	11000
4013	2362	8.0	12000
4013	2362	8.5	12000
4013	2362	9.0	12000
4013	2362	9.5	11000
4013	2362	10.0	11000
4013	2362	10.5	12000
4013	2362	11.0	11000
4013	2362	11.5	11000
<u>Borehole B3890R415^d</u>			
4016	2435	0.5	16000
4016	2435	1.0	24000
4016	2435	1.5	26000
4016	2435	2.0	22000
4016	2435	2.5	18000
4016	2435	3.0	14000
4016	2435	3.5	12000
4016	2435	4.0	12000
4016	2435	4.5	11000
4016	2435	5.0	11000
4016	2435	5.5	9000
4016	2435	6.0	7000
4016	2435	6.5	7000
4016	2435	7.0	6000
4016	2435	7.5	6000
<u>Borehole B3890R405</u>			
4021	2370	0.5	11000
4021	2370	1.0	14000
4021	2370	1.5	12000
4021	2370	2.0	12000

Table F-11
(continued)

Page 11 of 15

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R406^d</u>			
4035	2411	0.5	12000
4035	2411	1.0	16000
4035	2411	1.5	12000
4035	2411	2.0	12000
4035	2411	2.5	15000
4035	2411	3.0	20000
4035	2411	3.5	30000
4035	2411	4.0	16000
4035	2411	4.5	11000
4035	2411	5.0	10000
4035	2411	5.5	10000
4035	2411	6.0	11000
4035	2411	6.5	10000
4035	2411	7.0	9000
4035	2411	7.5	8000
<u>Borehole B3890R413</u>			
4052	2667	0.5	10000
4052	2667	1.0	11000
4052	2667	1.5	12000
4052	2667	2.0	12000
4052	2667	2.5	12000
4052	2667	3.0	11000
4052	2667	3.5	10000
4052	2667	4.0	10000
4052	2667	4.5	10000
4052	2667	5.0	10000
4052	2667	5.5	9000
4052	2667	6.0	9000
4052	2667	6.5	10000
4052	2667	7.0	11000
4052	2667	7.5	12000
4052	2667	8.0	11000
4052	2667	8.5	11000
4052	2667	9.0	11000
4052	2667	9.5	11000
4052	2667	10.0	11000
4052	2667	10.5	11000
4052	2667	11.0	11000
4052	2667	11.5	11000
4052	2667	12.0	12000

Table F-11
(continued)

Page 12 of 15

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R438</u>			
4058	2492	0.5	8000
4058	2492	1.0	9000
4058	2492	1.5	9000
4058	2492	2.0	10000
4058	2492	2.5	10000
4058	2492	3.0	10000
4058	2492	3.5	10000
4058	2492	4.0	10000
4058	2492	4.5	10000
4058	2492	5.0	10000
4058	2492	5.5	11000
4058	2492	6.0	10000
4058	2492	6.5	9000
4058	2492	7.0	9000
4058	2492	7.5	8000
<u>Borehole B3890R407</u>			
4119	2524	0.5	7000
4119	2524	1.0	10000
4119	2524	1.5	12000
4119	2524	2.0	12000
4119	2524	2.5	11000
4119	2524	3.0	11000
4119	2524	3.5	12000
4119	2524	4.0	12000
4119	2524	4.5	12000
4119	2524	5.0	12000
4119	2524	5.5	13000
4119	2524	6.0	13000
4119	2524	6.5	13000
4119	2524	7.0	13000
4119	2524	7.5	12000
4119	2524	8.0	10000
4119	2524	8.5	10000
4119	2524	9.0	11000
4119	2524	9.5	12000
4119	2524	10.0	11000

Table F-11
(continued)

Page 13 of 15

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B38OR408</u>			
4125	2635	0.5	7000
4125	2635	1.0	7000
4125	2635	1.5	8000
4125	2635	2.0	9000
4125	2635	2.5	9000
4125	2635	3.0	10000
4125	2635	3.5	10000
4125	2635	4.0	11000
4125	2635	4.5	13000
4125	2635	5.0	13000
4125	2635	5.5	13000
4125	2635	6.0	12000
4125	2635	6.5	12000
4125	2635	7.0	13000
4125	2635	7.5	12000
4125	2635	8.0	11000
4125	2635	8.5	10000
4125	2635	9.0	11000
4125	2635	9.5	10000
4125	2635	10.0	11000
<u>Borehole B3890R412</u>			
4128	2931	0.5	5000
4128	2931	1.0	6000
4128	2931	1.5	7000
4128	2931	2.0	8000
4128	2931	2.5	11000
4128	2931	3.0	12000
4128	2931	3.5	13000
4128	2931	4.0	13000
4128	2931	4.5	13000
4128	2931	5.0	13000
4128	2931	5.5	12000
4128	2931	6.0	13000
4128	2931	6.5	13000
4128	2931	7.0	13000
4128	2931	7.5	13000
4128	2931	8.0	13000
4128	2931	8.5	13000
4128	2931	9.0	12000
4128	2931	9.5	12000
4128	2931	10.0	13000

Table F-11
(continued)

Page 14 of 15

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R410

4129	2740	0.5	6000
4129	2740	1.0	6000
4129	2740	1.5	6000
4129	2740	2.0	7000
4129	2740	2.5	9000
4129	2740	3.0	10000
4129	2740	3.5	11000
4129	2740	4.0	11000
4129	2740	4.5	12000
4129	2740	5.0	10000
4129	2740	5.5	9000
4129	2740	6.0	9000
4129	2740	6.5	11000
4129	2740	7.0	13000
4129	2740	7.5	13000
4129	2740	8.0	13000
4129	2740	8.5	13000
4129	2740	9.0	13000
4129	2740	9.5	13000
4129	2740	10.0	13000

Borehole B3890R411^d

4129	2827	0.5	5000
4129	2827	1.0	5000
4129	2827	1.5	5000
4129	2827	2.0	6000
4129	2827	2.5	8000
4129	2827	3.0	12000
4129	2827	3.5	12000
4129	2827	4.0	12000
4129	2827	4.5	12000
4129	2827	5.0	11000
4129	2827	5.5	11000
4129	2827	6.0	10000
4129	2827	6.5	10000
4129	2827	7.0	11000
4129	2827	7.5	13000

Table F-11

(continued)

Page 15 of 15

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R439^d</u>			
4158	2656	0.5	5000
4158	2656	1.0	7000
4158	2656	1.5	9000
4158	2656	2.0	9000
4158	2656	2.5	10000
4158	2656	3.0	10000
4158	2656	3.5	8000
4158	2656	4.0	7000
4158	2656	4.5	8000
4158	2656	5.0	7000
4158	2656	5.5	7000
4158	2656	6.0	7000
4158	2656	6.5	8000
4158	2656	7.0	9000
4158	2656	7.5	10000
4158	2656	8.0	11000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table F-12
Gamma Radiation Exposure Rates,
Interstate 80 (Westbound Right-of-Way)

<u>Coordinates^a</u>		Rate ^b (μ R/h)
East	North	
3927	2331	11
3927	2381	12
3940	2414	8
3978	2494	6
4072	2594	12
4134	2699	6

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Table F-13
Surface and Subsurface Radionuclide Concentrations in Soil,
205 Maywood Avenue

Page 1 of 5

<u>Coordinates</u>		Borehole No.	Depth (ft)	<u>Concentration (pCi/g ± sigma)</u>		
East	North			Uranium-238	Radium-226	Thorium-232
Surface						
10870	9840		0.0 - 0.5	< 9.3	4.1 ± 0.9	1.3 ± 0.7
10930	9840		0.0 - 0.5	< 7.3	2.6 ± 0.8	9.8 ± 1.1
11050	9850		0.0 - 0.5	< 3.4	.6 ± 0.3	.4 ± 0.1
11100	9503		0.0 - 0.5	< 4.3	< .7	5.4 ± 1.2
11110	9400		0.0 - 0.5	< 5.2	.7 ± 0.2	1.1 ± 0.3
11110	9414		0.0 - 0.5	< 6.1	.9 ± 0.3	1.3 ± 0.1
11110	9468		0.0 - 0.5	< 3	< .6	< .6
11110	9490		0.0 - 0.5	< 12.1	2.3 ± 0.7	18.1 ± 5.1
11190	9275		0.0 - 0.5	< 3.6	.8 ± 0.3	1.8 ± 0.4
11190	9290		0.0 - 0.5	< 2	.7 ± 0.2	.6 ± 0.4
11500	9750		0.0 - 0.5	< 3.5	< .6	.6 ± 0.4
11500	9800		0.0 - 0.5	< 5.3	1.1 ± 0.4	< 1
11540	9510		0.0 - 0.5	< 5.7	1.6 ± 0.4	3.3 ± 1.4
Subsurface						
10955	9610	B3890R605	0.0 - 2.0	< 8.7	< 1.2	7.6 ± 1.6
			3.0 - 4.0	< 3.7	.6 ± 0.3	< .9
			7.0 - 8.0	< 4.7	< .9	1.5 ± 0.5
11050	9620	B3890R606	0.0 - 1.0	< 5.6	< 1.1	2.8 ± 0.7
			2.0 - 3.0	< 5.5	.8 ± 0.2	< 1.3
			5.0 - 6.0	< 5.4	< 1	1.9 ± 0.4

Table F-13

(continued)

Page 2 of 5

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
11110	9400	AS058	1.5 - 2.0	< 3.5	< .9	1.3 \pm 0.6
			2.5 - 3.0	< 3.9	1 \pm 0.8	< 1.3
11110	9414	AS059	1.5 - 2.0	< 4.1	1 \pm 0.2	1.6 \pm 0.7
			3.0 - 3.5	< 5.9	< 1.2	3.5 \pm 1.6
11110	9468	AS056	1.0 - 1.5	< 8.2	1.5 \pm 0.7	4.2 \pm 1.7
			1.5 - 2.0	< 6.4	< .9	3.6 \pm 1.1
			2.5 - 3.0	< 4.7	< .7	< 1
			3.0 - 3.5	< 3.7	.7 \pm 0.4	< .7
11110	9490	AS055	1.0 - 1.5	< 6.8	1.5 \pm 0.9	3.8 \pm 1.4
			2.5 - 3.0	< 4.4	< .7	1 \pm 0.1
			3.0 - 3.5	< 4.4	.7 \pm 0.7	2.1 \pm 1.1
11110	9503	AS028	0.5 - 1.0	< 9.6	2.5 \pm 0.6	31 \pm 4.2
			1.0 - 1.5	< 5	< .1	4.5 \pm 0.5
			1.5 - 2.0	< 4.1	< .8	3.5 \pm 0.5
			2.0 - 2.5	< 3.1	1 \pm 0.3	1.7 \pm 0.4
			2.5 - 3.0	< 2.7	< .7	< 1
			3.0 - 3.5	< 2.1	.5 \pm 0.2	1 \pm 0.7
			3.5 - 4.0	< 2.6	< .5	1.1 \pm 0.2
			4.0 - 4.5	< 3.2	< .7	1.3 \pm 0.8
11120	9310	B3890R587	0.0 - 1.0	< 3.7	< .9	< 1
			6.0 - 7.0	< 6.6	1.9 \pm 0.6	2.3 \pm 1.3
			13.0 - 14.0	< 3.2	< .7	.7 \pm 0.6
11120	9385	B3890R590	0.0 - 1.0	< 4.1	< .9	< 1.2
			2.0 - 3.0	< 4.1	< .9	2.7 \pm 0.5
			9.0 - 10.0	< 3.2	< .7	< 1.1
11120	9414	B3890R591	0.0 - 1.0	< 4.3	.6 \pm 0.2	.8 \pm 0.1
			6.0 - 7.0	< 3.4	< .8	< 1
			9.0 - 10.0	< 3.7	< .8	< 1.2
11120	9445	B3890R592	0.0 - 1.0	< 3.6	< .8	< 1.4
			1.0 - 2.0	< 6.5	< 1.4	2.9 \pm 2.7
			7.0 - 8.0	< 7.7	.9 \pm 0.3	1.4 \pm 0.2
11120	9470	B3890R593	0.0 - 1.0	< 3.8	.7 \pm 0.1	.9 \pm 0.4
			5.0 - 6.0	< 1.6	.6 \pm 0.1	.9 \pm 0.3
			7.0 - 8.0	< 3.5	.6 \pm 0.4	.7 \pm 0.5

Table F-13
(continued)

Page 3 of 5

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g ± sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
11120	9485	B3890R594	0.0 - 2.0	< 1.9	.6 ± 0.3	1 ± 0.4
			6.0 - 7.0	< 3.5	.6 ± 0.2	.6 ± 0.4
			7.0 - 8.0	< 1.4	.3 ± 0.1	.4 ± 0.3
11120	9520	B3890R595	0.0 - 1.0	< 2	.8 ± 0.4	.7 ± 0.4
			1.0 - 2.0	< 1.9	.8 ± 0.1	.9 ± 0.4
			5.0 - 6.0	< 1.8	.6 ± 0.1	.8 ± 0.3
11120	9575	B3890R596	0.0 - 1.0	< 3.2	.5 ± 0.3	.4 ± 0.4
			3.0 - 4.0	< 2	.6 ± 0.1	.8 ± 0.4
			5.0 - 6.0	< 2.7	.5 ± 0.3	.9 ± 0.3
11157	9646	B3890R621	0.0 - 1.0	< 3.9	< 1.2	1.8 ± 1.0
			2.0 - 3.0	< 2.5	< .6	1 ± 0.4
			5.0 - 6.0	< 3.2	< .8	< 1.3
11190	9275	AS076	1.5 - 2.0	< 5.6	1.4 ± 0.5	3.3 ± 0.4
			3.5 - 4.0	< 3.4	.6 ± 0.2	.6 ± 0.4
11190	9290	AS077	1.5 - 2.0	< 3.5	.9 ± 0.4	.9 ± 0.1
			3.0 - 3.5	< 8.1	1.6 ± 0.5	3.1 ± 0.9
11195	9620	B3890R623	0.0 - 1.0	< 9.1	1.4 ± 0.2	1.7 ± 0.5
			3.0 - 4.0	< 5.1	1.7 ± 0.2	2.5 ± 0.2
			5.0 - 6.0	< 5	1.5 ± 1.0	2.7 ± 1.6
11200	9320	B3890R599	0.0 - 2.0	< 4.3	1.1 ± 0.5	1 ± 0.5
			4.0 - 6.0	< 3.4	1.7 ± 0.3	1.6 ± 0.7
			9.0 - 10.0	< 2.1	.6 ± 0.3	.8 ± 0.4
11200	9650	AS027	0.5 - 1.0	< 3	< .7	1.3 ± 1.0
11253	9650	B3890R620	0.0 - 2.0	< 2.7	< .8	< 1.2
			6.0 - 7.0	< 3.1	< .8	1.4 ± 0.7
			7.0 - 8.0	< 2.4	< .6	< .8
11290	9350	B3890R607	0.0 - 2.0	< 4.4	< 1	2 ± 0.3
			6.0 - 7.0	< 4.7	.6 ± 0.1	.7 ± 0.3
			11.0 - 12.0	< 5.2	.8 ± 0.2	1.1 ± 0.5
11300	9275	B3890R600	0.0 - 1.0	< 3.2	.6 ± 0.1	.7 ± 0.4
			4.0 - 5.0	< 1.9	.8 ± 0.2	.9 ± 0.3
			6.0 - 8.0	2.5 ± 1.9	.8 ± 0.1	.6 ± 0.5

Table F-13
(continued)

Page 4 of 5

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g ± sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
11357	9813	B3890R618	0.0 - 2.0	< 3.5	< 1	< 1.3
			5.0 - 6.0	< 2.5	< .7	< .9
			7.0 - 8.0	< 7.2	.8 ± 0.2	1 ± 0.2
11365	9758	B3890R616	0.0 - 2.0	< 3	< .9	< 1.3
			5.0 - 6.0	< 2.3	< .7	< .9
			7.0 - 8.0	< 9.7	.6 ± 0.2	.9 ± 0.3
11368	9660	B3890R619	0.0 - 1.0	< 3.4	< .8	2.2 ± 0.3
			2.0 - 3.0	< 2.4	.7 ± 0.2	1.2 ± 0.1
			6.0 - 8.0	< 2.2	.9 ± 0.3	1.3 ± 0.5
11400	9300	B3890R601	0.0 - 2.0	< 4	< .7	.8 ± 0.6
			2.0 - 2.5	< 3.3	1 ± 0.7	1.4 ± 0.5
			4.0 - 6.0	< 3.9	< .7	< 1
11470	9810	B3890R617	0.0 - 2.0	< 4.3	< 1	< 1.2
			4.0 - 5.0	< 4.1	< 1	< 1.6
			8.0 - 10.0	< 2.3	< .5	.9 ± 0.3
11495	9325	B3890R602	0.0 - 1.0	< 7.2	< 1.1	4.1 ± 1.3
			9.0 - 10.0	< 5.2	2 ± 0.3	2 ± 0.7
			12.0 - 14.0	< 3.1	< .6	.9 ± 0.4
11500	9700	B3890R614	0.0 - 1.0	< 3.2	< .9	< 1.3
			2.0 - 4.0	< 2.8	.8 ± 0.1	< 1.1
			7.0 - 8.0	< 3	< .9	< 1.2
11535	9650	B3890R613	0.0 - 1.0	< 2.6	< .8	< 1
			3.0 - 4.0	<	< .8	< 1
11560	9550	B3890R612	0.0 - 1.0	< 2.9		< .9
			2.0 - 4.0	< 2.7	.8 ± 0.2	< .9
			6.0 - 8.0	< 6.4	.8 ± 0.1	< 1
11598	9753	B3890R615	0.0 - 2.0	< 3	< .9	< 1.2
			4.0 - 6.0	< 4.5	1.6 ± 0.7	< 1.6
11600	9275	B3890R603	0.0 - 1.0	< 3.4	< .7	< .8
			7.0 - 8.0	< 3.9	.9 ± 0.3	< .9
			14.0 - 16.0	< 3.1	.6 ± 0.3	.9 ± 0.2
11600	9500	AS026	2.0 - 2.5	< 5.2		

Table F-13
(continued)

Page 5 of 5

Coordinates		Borehole No.	Depth (ft)	Concentration (pCi/g \pm sigma)		
East	North			Uranium-238	Radium-226	Thorium-232
11602	9400	B3890R611	0.0 - 2.0	< 4.5	2 \pm 0.8	< 1.5
			7.0 - 8.0	< 4.2	1.3 \pm 0.3	1.5 \pm 0.5
			11.0 - 12.0	< 6.4	.7 \pm 0.1	.7 \pm 0.2
11630	9340	B3890R609	0.0 - 2.0	< 2.5	< .6	< .7
			7.0 - 8.0	< 4.4	< .9	1.8 \pm 0.8
			10.0 - 12.0	< 4.4	1.1 \pm 0.3	< 1.3
11700	9300	B3890R608	0.0 - 2.0	< 5.6	.8 \pm 0.1	.7 \pm 0.2
			7.0 - 8.0	< 3.9	.5 \pm 0.1	.8 \pm 0.6
			11.0 - 12.0	< 4.8	.8 \pm 0.2	1.2 \pm 0.3
11700	9400	B3890R610	0.0 - 1.0	< 2.8	< .6	< .7
			5.0 - 6.0	< 3.3	< .7	< 1.1
			9.0 - 10.0	< 3.3	< .6	< 1.2

Table F-14
Downhole Gamma Logging Results,
205 Maywood Avenue

Page 1 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R606</u>			
11050	9620	0.5	9000
11050	9620	1.0	9200
11050	9620	1.5	9200
11050	9620	2.0	9100
11050	9620	2.5	9000
11050	9620	3.0	9400
11050	9620	3.5	10000
11050	9620	4.0	11000
11050	9620	4.5	11000
11050	9620	5.0	11000
11050	9620	5.5	10000
11050	9620	6.0	10000
<u>Borehole AS058</u>			
11110	9400	0.5	7000
11110	9400	1.0	8000
11110	9400	1.5	9000
11110	9400	2.0	10000
11110	9400	2.5	8000
11110	9400	3.0	5000
<u>Borehole AS059</u>			
11110	9414	0.5	8000
11110	9414	1.0	11000
11110	9414	1.5	13000
11110	9414	2.0	16000
11110	9414	2.5	13000
11110	9414	3.0	14000
11110	9414	3.5	14000
<u>Borehole AS056</u>			
11110	9468	0.5	15000
11110	9468	1.0	38000
11110	9468	1.5	43000
11110	9468	2.0	20000
11110	9468	2.5	12000
11110	9468	3.0	10000
11110	9468	3.5	9000
11110	9468	4.0	9000

Table F-14
(continued)

Page 2 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole AS055</u>			
11110	9490	0.5	24000
11110	9490	1.0	49000
11110	9490	1.5	26000
11110	9490	2.0	24000
11110	9490	2.5	11000
11110	9490	3.0	6000
11110	9490	3.5	5000
<u>Borehole AS028</u>			
11110	9503	0.5	97000
11110	9503	1.0	87000
11110	9503	1.5	71000
11110	9503	2.0	31000
11110	9503	2.5	19000
11110	9503	3.0	12000
11110	9503	3.5	11000
11110	9503	4.0	10000
11110	9503	4.5	10000
<u>Borehole B3890C622</u>			
11115	9478	0.5	7000
11115	9478	1.0	8000
11115	9478	1.5	9000
11115	9478	2.0	8000
11115	9478	2.5	8000
11115	9478	3.0	9000
11115	9478	3.5	9000
11115	9478	4.0	9000
11115	9478	4.5	10000
11115	9478	5.0	10000
11115	9478	5.5	10000
11115	9478	6.0	10000
<u>Borehole B3890R587</u>			
11120	9310	0.5	9000
11120	9310	1.0	11000
11120	9310	1.5	9000
11120	9310	2.0	11000
11120	9310	2.5	10000
11120	9310	3.0	9000
11120	9310	3.5	9000

Table F-14
(continued)

Page 3 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R587 (continued)

11120	9310	4.0	11000
11120	9310	4.5	14000
11120	9310	5.0	16000
11120	9310	5.5	14000
11120	9310	6.0	14000
11120	9310	6.5	16000
11120	9310	7.0	13000
11120	9310	7.5	11000
11120	9310	8.0	11000
11120	9310	8.5	11000
11120	9310	9.0	10000
11120	9310	9.5	9000
11120	9310	10.0	9000
11120	9310	10.5	9000
11120	9310	11.0	9000
11120	9310	11.5	9000
11120	9310	12.0	9000
11120	9310	12.5	9000
11120	9310	13.0	8000
11120	9310	13.5	8000
11120	9310	14.0	15000

Borehole B3890R590^d

11120	9385	0.5	9000
11120	9385	1.0	7000
11120	9385	1.5	10000
11120	9385	2.0	10000
11120	9385	2.5	11000
11120	9385	3.0	13000
11120	9385	3.5	19000
11120	9385	4.0	12000
11120	9385	4.5	12000
11120	9385	5.0	13000
11120	9385	5.5	11000
11120	9385	6.0	10000
11120	9385	6.5	10000
11120	9385	7.0	10000
11120	9385	7.5	10000
11120	9385	8.0	10000
11120	9385	8.5	10000
11120	9385	9.0	9000
11120	9385	9.5	11000

Table F-14
(continued)

Page 4 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R591^d</u>			
11120	9414	0.5	8000
11120	9414	1.0	8000
11120	9414	1.5	12000
11120	9414	2.0	13000
11120	9414	2.5	12000
11120	9414	3.0	1000
11120	9414	3.5	11000
11120	9414	4.0	11000
11120	9414	4.5	11000
11120	9414	5.0	10000
11120	9414	5.5	9000
11120	9414	6.0	9000
11120	9414	6.5	9000
11120	9414	7.0	8000
11120	9414	7.5	8000
11120	9414	8.0	8000
11120	9414	8.5	8000
11120	9414	9.0	8000
<u>Borehole AS057</u>			
11120	9444	0.5	8000
11120	9444	1.0	10000
11120	9444	1.5	13000
<u>Borehole B3890R593^d</u>			
11120	9470	0.5	9000
11120	9470	1.0	8000
11120	9470	1.5	11000
11120	9470	2.0	13000
11120	9470	2.5	17000
11120	9470	3.0	12000
11120	9470	3.5	10000
11120	9470	4.0	10000
11120	9470	4.5	10000
11120	9470	5.0	10000
11120	9470	5.5	10000
11120	9470	6.0	12000
11120	9470	6.5	11000
11120	9470	7.0	11000

Table F-14
(continued)

Page 5 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R590</u>			
11120	9385	0.5	8900
11120	9385	1.0	7400
11120	9385	1.5	10000
11120	9385	2.0	10300
11120	9385	2.5	11200
11120	9385	3.0	13000
11120	9385	3.5	19000
11120	9385	4.0	12000
11120	9385	4.5	12000
11120	9385	5.0	13000
11120	9385	5.5	11000
11120	9385	6.0	9700
11120	9385	6.5	9700
11120	9385	7.0	9600
11120	9385	7.5	9600
11120	9385	8.0	9600
11120	9385	8.5	9700
11120	9385	9.0	9200
11120	9385	9.5	11000
<u>Borehole B3890R592^d</u>			
11120	9445	0.5	8000
11120	9445	1.0	10000
11120	9445	1.5	12000
11120	9445	2.0	11000
11120	9445	2.5	12000
11120	9445	3.0	12000
11120	9445	3.5	10000
11120	9445	4.0	9000
11120	9445	4.5	10000
11120	9445	5.0	10000
11120	9445	5.5	10000
11120	9445	6.0	10000
11120	9445	6.5	10000
11120	9445	7.0	10000
11120	9445	7.5	10000

Table F-14
(continued)

Page 6 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R594^d</u>			
11120	9485	0.5	8000
11120	9485	1.0	7000
11120	9485	1.5	10000
11120	9485	2.0	9000
11120	9485	2.5	10000
11120	9485	3.0	11000
11120	9485	3.5	10000
11120	9485	4.0	10000
11120	9485	4.5	9000
11120	9485	5.0	10000
11120	9485	5.5	6000
11120	9485	6.0	8000
11120	9485	6.5	8000
11120	9485	7.0	9000
<u>Borehole B3890R595^d</u>			
11120	9520	0.5	8000
11120	9520	1.0	8000
11120	9520	1.5	11000
11120	9520	2.0	10000
11120	9520	2.5	10000
11120	9520	3.0	10000
11120	9520	3.5	10000
11120	9520	4.0	9000
11120	9520	4.5	9000
11120	9525	5.0	9000
11120	9525	5.5	9000
<u>Borehole B3890R596</u>			
11120	9575	0.5	6000
11120	9575	1.0	7000
11120	9575	1.5	6000
11120	9575	2.0	5000
11120	9575	2.5	9000
11120	9575	3.0	10000
11120	9575	3.5	10000
11120	9575	4.0	10000
11120	9575	4.5	10000
11120	9575	5.0	10000
11120	9575	5.5	10000
11120	9575	6.0	9000

Table F-14
(continued)

Page 7 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R621^d</u>			
11157	9646	0.5	7000
11157	9646	1.0	9000
11157	9646	1.5	11000
11157	9646	2.0	11000
11157	9646	2.5	9000
11157	9646	3.0	8000
11157	9646	3.5	8000
11157	9646	4.0	8000
11157	9646	4.5	8000
11157	9646	5.0	7000
<u>Borehole AS076</u>			
11190	9275	0.5	12000
11190	9275	1.0	15000
11190	9275	1.5	13000
11190	9275	2.0	13000
11190	9275	2.5	11000
11190	9275	3.0	10000
11190	9275	3.5	10000
<u>Borehole AS077</u>			
11190	9290	0.5	7000
11190	9290	1.0	7000
11190	9290	1.5	6000
11190	9290	2.0	12000
11190	9290	2.5	15000
11190	9290	3.0	18000
<u>Borehole B3890R623^d</u>			
11195	9620	0.5	8000
11195	9620	1.0	9000
11195	9620	1.5	10000
11195	9620	2.0	9000
11195	9620	2.5	9000
11195	9620	3.0	9000
11195	9620	3.5	9000
11195	9620	4.0	9000
11195	9620	4.5	9000
11195	9620	5.0	9000

Table F-14
(continued)

Page 8 of 16

<u>Coordinates^a</u>		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R599^d</u>			
11200	9320	0.5	11000
11200	9320	1.0	9000
11200	9320	1.5	11000
11200	9320	2.0	12000
11200	9320	2.5	13000
11200	9320	3.0	15000
11200	9320	3.5	19000
11200	9320	4.0	19000
11200	9320	4.5	19000
11200	9320	5.0	17000
11200	9320	5.5	17000
11200	9320	6.0	16000
11200	9320	6.5	10000
11200	9320	7.0	8000
11200	9320	7.5	7000
11200	9320	8.0	6000
<u>Borehole B3890R620^d</u>			
11253	9650	0.5	6000
11253	9650	1.0	6000
11253	9650	1.5	7000
11253	9650	2.0	7000
11253	9650	2.5	7000
11253	9650	3.0	7000
11253	9650	3.5	8000
11253	9650	4.0	8000
11253	9650	4.5	8000
11253	9650	5.0	9000
11253	9650	5.5	9000
11253	9650	6.0	8000
11253	9650	6.5	8000
11253	9650	7.0	10000
<u>Borehole B3890R607^d</u>			
11290	9350	0.5	9000
11290	9350	1.0	10000
11290	9350	1.5	13000
11290	9350	2.0	12000
11290	9350	2.5	12000
11290	9350	3.0	8000

Table F-14
(continued)

Page 9 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R607^d</u> (continued)			
11290	9350	3.5	7000
11290	9350	4.0	6000
11290	9350	4.5	6000
11290	9350	5.0	6000
11290	9350	5.5	6000
11290	9350	6.0	7000
11290	9350	6.5	6000
11290	9350	7.0	6000
11290	9350	7.5	6000
11290	9350	8.0	7000
11290	9350	8.5	7000
11290	9350	9.0	6000
11290	9350	9.5	6000
11290	9350	10.0	6000
11290	9350	10.5	5000
11290	9350	11.0	6000
<u>Borehole B3890R600</u>			
11300	9275	0.5	7000
11300	9275	1.0	7000
11300	9275	1.5	7000
11300	9275	2.0	8000
11300	9275	2.5	10000
11300	9275	3.0	13000
11300	9275	3.5	14000
11300	9275	4.0	12000
11300	9275	4.5	11000
11300	9275	5.0	11000
11300	9275	5.5	10000
11300	9275	6.0	10000
11300	9275	6.5	9000
11300	9275	7.0	9000
<u>Borehole B3890R618^d</u>			
11357	9813	0.5	9000
11357	9813	1.0	7000
11357	9813	1.5	5000
11357	9813	2.0	6000
11357	9813	2.5	5000
11357	9813	3.0	7000

Table F-14
(continued)

Page 10 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
<u>East</u>	<u>North</u>		
<u>Borehole B3890R618^d</u> (continued)			
11357	9813	3.5	6000
11357	9813	4.0	7000
11357	9813	4.5	7000
11357	9813	5.0	7000
11357	9813	5.5	7000
11357	9813	6.0	7000
11357	9813	6.5	7000
11357	9813	7.0	7000
11357	9813	7.5	7000
<u>Borehole B3890R616^d</u>			
11365	9758	0.5	6000
11365	9758	1.0	5000
11365	9758	1.5	5000
11365	9758	2.0	7000
11365	9758	2.5	6000
11365	9758	3.0	3000
11365	9758	3.5	5000
11365	9758	4.0	6000
11365	9758	4.5	7000
11365	9758	5.0	7000
11365	9758	5.5	7000
11365	9758	6.0	7000
11365	9758	6.5	7000
11365	9758	7.0	7000
11365	9758	7.5	6000
<u>Borehole B3890R619^d</u>			
11368	9660	0.5	10000
11368	9660	1.0	12000
11368	9660	1.5	14000
11368	9660	2.0	14000
11368	9660	2.5	10000
11368	9660	3.0	7000
11368	9660	3.5	6000
11368	9660	4.0	6000
11368	9660	4.5	8000
11368	9660	5.0	8000
11368	9660	5.5	9000
11368	9660	6.0	10000
11368	9660	6.5	11000

Table F-14
(continued)

Page 11 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R601</u>			
11400	9300	0.5	7000
11400	9300	0.5	7000
11400	9300	1.0	9000
11400	9300	1.0	9000
11400	9300	1.5	10000
11400	9300	1.5	10000
11400	9300	2.0	10000
11400	9300	2.0	10000
11400	9300	2.5	10000
11400	9300	2.5	10000
11400	9300	3.0	11000
11400	9300	3.0	11000
11400	9300	3.5	10000
11400	9300	3.5	10000
11400	9300	4.0	10000
11400	9300	4.0	10000
11400	9300	4.5	9000
11400	9300	4.5	9000
<u>Borehole B3890R617^d</u>			
11470	9810	0.5	3000
11470	9810	1.0	4000
11470	9810	1.5	6000
11470	9810	2.0	8000
11470	9810	2.5	8000
11470	9810	3.0	8000
11470	9810	3.5	8000
11470	9810	4.0	7000
11470	9810	4.5	7000
11470	9810	5.0	7000
11470	9810	5.5	8000
11470	9810	6.0	8000
11470	9810	6.5	8000
11470	9810	7.0	7000
11470	9810	7.5	9000
11470	9810	8.0	9000
<u>Borehole B3890R602^d</u>			
11495	9325	0.5	6000
11495	9325	1.0	7000
11495	9325	1.5	7000

Table F-14
(continued)

Page 12 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		

Borehole B3890R602^d (continued)

11495	9325	2.0	7000
11495	9325	2.5	7000
11495	9325	3.0	6000
11495	9325	3.5	6000
11495	9325	4.0	6000
11495	9325	4.5	6000
11495	9325	5.0	11000
11495	9325	5.5	11000
11495	9325	6.0	13000
11495	9325	6.5	11000
11495	9325	7.0	10000
11495	9325	7.5	8000
11495	9325	8.0	7000
11495	9325	8.5	5000
11495	9325	9.0	6000
11495	9325	9.5	8000
11495	9325	10.0	7000
11495	9325	10.5	6000
11495	9325	11.0	6000
11495	9325	11.5	6000
11495	9325	12.0	5000

Borehole B3890R614^d

11500	9700	0.5	4000
11500	9700	1.0	6000
11500	9700	1.5	7000
11500	9700	2.0	7000
11500	9700	2.5	7000
11500	9700	3.0	7000
11500	9700	3.5	7000
11500	9700	4.0	7000
11500	9700	4.5	8000
11500	9700	5.0	9000
11500	9700	5.5	8000
11500	9700	6.0	8000
11500	9700	6.5	8000
11500	9700	7.0	7000

Table F-14
(continued)

Page 13 of 16

<u>Coordinates^a</u>		<u>Depth^b</u> (ft)	<u>Count Rate^c</u> (cpm)
East	North		
<u>Borehole B3890R613^d</u>			
11535	9650	0.5	7000
11535	9650	1.0	8000
11535	9650	1.5	8000
11535	9650	2.0	8000
11535	9650	2.5	10000
11535	9650	3.0	11000
11535	9650	3.5	11000
<u>Borehole B3890R612^d</u>			
11560	9550	0.5	6000
11560	9550	1.0	6000
11560	9550	1.5	8000
11560	9550	2.0	7000
11560	9550	2.5	4000
11560	9550	3.0	2000
11560	9550	3.5	2000
11560	9550	4.0	4000
11560	9550	4.5	5000
11560	9550	5.0	6000
11560	9550	5.5	6000
11560	9550	6.0	6000
<u>Borehole B3890R615^d</u>			
11598	9753	0.5	5000
11598	9753	1.0	5000
11598	9753	1.5	5000
11598	9753	2.0	6000
11598	9753	2.5	9000
11598	9753	3.0	9000
<u>Borehole B3890R603^d</u>			
11600	9275	0.5	6000
11600	9275	1.0	7000
11600	9275	1.5	8000
11600	9275	2.0	10000
11600	9275	2.5	9000
11600	9275	3.0	9000
11600	9275	3.5	9000
11600	9275	4.0	9000

Table F-14
(continued)

Page 14 of 16

Coordinates ^a		Depth ^b	Count Rate ^c
East	North	(ft)	(cpm)

Borehole B3890R603^d (continued)

11600	9275	4.5	9000
11600	9275	5.0	8000
11600	9275	5.5	7000
11600	9275	6.0	7000
11600	9275	6.5	7000
11600	9275	7.0	7000
11600	9275	7.5	7000
11600	9275	8.0	8000
11600	9275	8.5	7000
11600	9275	9.0	7000
11600	9275	9.5	7000
11600	9275	10.0	6000
11600	9275	10.5	8000
11600	9275	11.0	8000
11600	9275	11.5	7000
11600	9275	12.0	7000
11600	9275	12.5	7000
11600	9275	13.0	7000
11600	9275	13.5	7000
11600	9275	14.0	7000
11600	9275	14.5	7000
11600	9275	15.0	6000

Borehole B3890R611^d

11602	9400	0.5	7000
11602	9400	1.0	5000
11602	9400	1.5	4000
11602	9400	2.0	3000
11602	9400	2.5	2000
11602	9400	3.0	2000
11602	9400	3.5	2000
11602	9400	4.0	2000
11602	9400	4.5	1000
11602	9400	5.0	2000
11602	9400	5.5	3000
11602	9400	6.0	4000
11602	9400	6.5	5000
11602	9400	7.0	8000
11602	9400	7.5	9000
11602	9400	8.0	10000
11602	9400	8.5	9000
11602	9400	9.0	9000
11602	9400	9.5	9000

Table F-14
(continued)

Page 15 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R609^d</u>			
11630	9340	0.5	5000
11630	9340	1.0	4000
11630	9340	1.5	4000
11630	9340	2.0	3000
11630	9340	2.5	2000
11630	9340	3.0	2000
11630	9340	3.5	2000
11630	9340	4.0	2000
11630	9340	4.5	3000
11630	9340	5.0	4000
11630	9340	5.5	3000
11630	9340	6.0	4000
11630	9340	6.5	8000
11630	9340	7.0	10000
11630	9340	7.5	10000
11630	9340	8.0	10000
11630	9340	8.5	9000
11630	9340	9.0	9000
11630	9340	9.5	9000
11630	9340	10.0	11000
<u>Borehole B3890R608^d</u>			
11700	9300	0.5	5000
11700	9300	1.0	5000
11700	9300	1.5	4000
11700	9300	2.0	4000
11700	9300	2.5	2000
11700	9300	3.0	2000
11700	9300	3.5	2000
11700	9300	4.0	2000
11700	9300	4.5	3000
11700	9300	5.0	4000
11700	9300	5.5	4000
11700	9300	6.0	4000
11700	9300	6.5	4000
11700	9300	7.0	4000
11700	9300	7.5	4000
11700	9300	8.0	5000
11700	9300	8.5	5000
11700	9300	9.0	6000

Table F-14
(continued)

Page 16 of 16

Coordinates ^a		Depth ^b (ft)	Count Rate ^c (cpm)
East	North		
<u>Borehole B3890R608^d</u> (continued)			
11700	9300	9.5	6000
11700	9300	10.0	6000
11700	9300	10.5	6000
11700	9300	11.0	8000
11700	9300	11.5	7000
<u>Borehole B3890R610^d</u>			
11700	9400	0.5	6000
11700	9400	1.0	3000
11700	9400	1.5	2000
11700	9400	2.0	2000
11700	9400	2.5	2000
11700	9400	3.0	2000
11700	9400	3.5	2000
11700	9400	4.0	2000
11700	9400	4.5	4000
11700	9400	5.0	8000
11700	9400	5.5	9000
11700	9400	6.0	10000
11700	9400	6.5	10000
11700	9400	7.0	11000
11700	9400	7.5	11000
11700	9400	8.0	11000
11700	9400	8.5	11000
11700	9400	9.0	11000
11700	9400	9.5	10000

^aBorehole locations are shown in figures in Volume I, Section 4.

^bThe variations in depths of boreholes and corresponding results given in this table are based on the boreholes penetrating the contamination or the drill reaching refusal.

^cInstrument used was 5.0- by 5.0-cm (2- by 2-in.) thallium-activated sodium iodide gamma scintillation detector.

^dBottom of borehole collapsed.

Table F-15
Gamma Radiation Exposure Rates,
205 Maywood Avenue

Coordinates ^a		Rate ^b (μ R/h)
East	North	
10790	9840	9
10790	9980	7
10960	9640	6
10970	9880	5
11080	9810	8
11110	9520	10
11120	9480	12
11130	9310	9
11130	9370	10
11140	9290	9
11180	9810	8
11230	9280	9
11280	9360	10
11280	9730	6
11300	9810	8
11320	9280	8
11360	9660	11
11360	9830	12
11370	9780	13
11450	9340	7
11490	9280	10
11550	9510	15
11580	9310	8
11610	9550	13
11650	9440	11
11690	9280	6
11710	9390	9

^aMeasurement locations are shown in figures in Volume I, Section 4.

^bMeasurements include background. Annual average background for the Maywood area is 9 μ R/h.

Chemical Data

Table F-16
Metals and Rare Earths, Commercial/Governmental Vicinity Properties,
Soil Samples

Page 1 of 4

Sample ID No.	138-MWC-015		138-MWC-016		138-MWC-017		138-MWC-018		138-MWC-001		138-MWC-002
Borehole ID No.	B3890C570		B3890C570		B3890C570		B3890C570		B3890C530		B3890C530
Sample Depth (ft)	0 - 2		2 - 4		6 - 7.2		4 - 6		0 - 2		2 - 4
Analyte											
Aluminum, Total	2670	=	2580	=	1470	=	2290	=	7970	=	9780
Antimony, Total	6.2	R	4.8	U	6.6	R	4.3	U	5.2	UJ	3.6
Arsenic, Total	4.3	=	0.91	B	0.79	B	0.85	B	3.5	=	3.1
Barium, Total	136	=	84.2	=	45.4	=	91.3	=	214	=	104
Beryllium, Total	0.32	B	0.24	B	0.18	U	0.24	B	1.2	U	0.82
Boron, Total	16.0	U	21.8	U	19.7	U	18.2	U	23.5	U	16.3
Cadmium, Total	0.64	U	0.87	U	0.73	U	0.79	U	0.94	U	0.82
Calcium, Total	2720	=	1430	=	903	B	4810	=	3720	=	3920
Cerium, Total	104	=	43.6	U	309	=	36.4	U	193	=	73.3
Chromium, Total	34.1	J	11.0	J	1.7	BJ	26.7	J	102	R	30.6
Cobalt, Total	3.7	B	3.8	B	2.9	B	2.4	B	11.7	U	9.3
Copper, Total	40.6	R	10.9	R	4.9	R	31.9	R	30.5	R	27.5
Dysprosium, Total	32.0	U	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Erbium, Total	47.8	=	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Europium, Total	32.0	U	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Gadolinium, Total	32.0	U	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Holmium, Total	32.0	U	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Iron, Total	4470	=	4990	=	3830	=	5310	=	13700	=	17900
Lanthanum, Total	193	=	43.6	U	203	=	952	=	137	=	49.5
Lead, Total	171	=	7.2	=	2.9	=	18.3	=	74.6	=	46.8
Lithium, Total	16.0	U	21.8	U	19.7	U	18.2	U	23.5	U	16.3
Lutetium, Total	32.0	U	43.6	U	39.4	U	64.6	=	46.9	U	32.7
Magnesium, Total	888	=	1100	=	689	B	988	=	2110	=	4180
Manganese, Total	72.5	=	43.7	=	34.8	=	130	=	198	=	290
Molybdenum, Total	16.0	U	21.8	U	19.7	U	18.2	U	23.5	U	16.3
Neodymium, Total	56.1	=	43.6	U	158	=	36.4	U	104	=	39.7
Nickel, Total	4.6	B	5.5	B	3.2	B	6.7	B	12.3	=	17.3
Potassium, Total	147	U	200	U	170	B	307	B	1170	U	993
Praseodymium, Total	32.0	U	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Samarium, Total	32.0	U	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Selenium, Total	0.86	BJ	0.43	UJ	0.44	UJ	0.39	UJ	0.36	UJ	0.31
Silver, Total	0.80	R	0.87	U	0.73	U	0.79	U	0.94	UJ	1.6
Sodium, Total	128	B	150	B	111	B	104	B	1170	U	817
Tellurium, Total	32.0	U	43.6	U	39.4	U	64.4	=	46.9	U	32.7
Terbium, Total	62.2	=	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Thallium, Total	0.90	U	0.86	U	0.87	U	0.79	UJ	1.8	UJ	1.6
Thulium, Total	32.0	U	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Vanadium, Total	14.1	=	10.9	=	9.8	=	7.6	B	28.8	=	23.7
Ytterbium, Total	32.0	U	43.6	U	39.4	U	36.4	U	46.9	U	32.7
Zinc, Total	65.6	=	23.9	=	11.7	=	48.7	=	83.8	=	87.8

Concentration Units - mg/kg - milligrams per kilogram.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

NOTE: Unreliable results identified as such mainly due to rejected matrix spike recovery and/or low (or high) CRDL recovery percentages.

Table F-16
(continued)

Page 2 of 4

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MWC-003 B3890C530 4 - 6	138-MWC-004 B3890C530 6 - 8	138-MWC-020 B3890C622 0 - 2	138-MWC-021 B3890C622 2 - 4	138-MWC-022 B3890C622 4 - 6	138-MWC-033 B3890C628 0 - 2
Analyte						
Aluminum, Total	10100 =	11900 =	6080 =	3770 =	5980 =	3450 =
Antimony, Total	3.9 UJ	5.7 UJ	4.2 UJ	4.1 UJ	4.1 UJ	13.2 U
Arsenic, Total	2.1 U	0.5 J	5.3 =	1.7 =	2.1 =	1.7 U
Barium, Total	94.4 =	425 =	109 =	36 B	41.7 =	44.0 U
Beryllium, Total	0.92 =	1.3 U	0.44 B	0.26 B	0.47 UB	1.1 U
Boron, Total	17.6 U	25.7 U	20.8 U	20.2 U	20.6 U	22.0 U
Cadmium, Total	0.88 U	1.3 U	0.66 U	0.65 U	0.65 U	1.1 U
Calcium, Total	7990 =	4600 =	2360 =	920 B	984 B	1510 =
Cerium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Chromium, Total	27.8 R	238 J	6.9 =	4.4 =	6.8 =	16.0 =
Cobalt, Total	11.4 =	12.9 U	6.3 B	4.5 B	4.5 B	11.0 U
Copper, Total	49.6 J	26.3 J	101 J	11.3 J	31.9 J	13.5 =
Dysprosium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Erbium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Europium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Gadolinium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Holmium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Iron, Total	20700 =	15700 =	13100 =	5940 =	11.1 =	7040 =
Lanthanum, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Lead, Total	114 =	40.7 =	455 =	6.0 =	31.1 J	10.1 =
Lithium, Total	17.6 U	25.7 U	20.8 U	20.2 U	20.6 U	22.0 U
Lutetium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Magnesium, Total	7050 =	2330 =	1890 =	862 B	988 B	1250 =
Manganese, Total	294 =	252 =	145 =	65.8 =	69.7 =	163 =
Molybdenum, Total	17.6 U	25.7 U	20.8 U	20.2 U	20.6 U	22.0 U
Neodymium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Nickel, Total	23.3 =	20.9 =	8.6 =	4.5 B	6.0 B	8.8 U
Potassium, Total	1440 =	1290 U	369 B	417 B	335 B	1100 U
Praseodymium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Samarium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Selenium, Total	0.42 UJ	0.44 UJ	0.50 B	0.33 U	0.42 U	0.83 U
Silver, Total	0.90 J	1.0 UJ	0.24 U	2.0 U	2.1 U	2.2 U
Sodium, Total	880 U	1290 U	63.2 UB	34.8 UB	38.1 B	1100 U
Tellurium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Terbium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Thallium, Total	2.1 UJ	2.2 UJ	0.69 UJ	0.66 J	0.85 UJ	16.6 U
Thulium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	166 =
Vanadium, Total	32.1 =	36.7 =	17.4 =	6.2 B	11 =	11.0 U
Ytterbium, Total	35.2 U	51.5 U	41.6 U	40.4 U	41.3 U	44.0 U
Zinc, Total	113 =	92.8 =	109 J	25.0 J	80.9 =	23.4 =

Concentration Units - mg/kg - milligrams per kilogram.

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R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

NOTE: Unreliable results identified as such mainly due to rejected matrix spike recovery and/or low (or high) CRDL recovery percentages.

page 3 of 4

Sample ID No. Corehole ID No. Sample Depth (ft)	138-MWC-034 B3890C628 2 - 4	138-MWC-035 B3890C628 6 - 8	138-MWC-041 B3890C630 0 - 2	138-MWC-042 B3890C630 2 - 4	138-MWC-043 B3890C630 4 - 6	138-MWC-044 B3890C630 6 - 8
Analyte						
Aluminum, Total	4660 =	4060 =	3600 J	3990 J	5130 J	4780 J
Antimony, Total	12.8 U	13.7 U	4.2 U	4.4 U	4.1 U	6.1 B
Arsenic, Total	2.7 =	3.5 =	2.6 =	1.8 =	2.4 =	4.9 =
Barium, Total	220 =	134 =	130 J	111 J	189 J	168 J
Beryllium, Total	1.1 U	1.1 U	0.23 B	0.17 B	0.28 B	0.3 B
Boron, Total	21.3 U	22.7 U	20.6 U	21.5 U	20.3 U	21.5 U
Cadmium, Total	1.1 U	1.1 U	0.66 U	0.69 U	0.65 U	0.69 U
Calcium, Total	3220 =	1950 =	3020 J	2890 J	4760 J	13400 J
Cerium, Total	42.6 U	45.5 U	41.2 U	48.2 =	40.5 U	52.3 =
Chromium, Total	256 =	7.7 =	20.1 R	23.1 R	25.9 R	95.7 R
Cobalt, Total	10.6 U	11.4 U	4.1 B	4.1 B	5.1 B	5.4 B
Copper, Total	15.8 =	9.1 =	24.1 =	17.5 =	41.5 =	33.5 =
Ceysprosium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Cerblum, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Europium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Gadolinium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Golmium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Iron, Total	6380 =	9130 =	7360 J	7400 J	10300 J	8910 J
Lanthanum, Total	42.6 U	45.5 U	41.2 U	43.1 U	46.5 J	43.0 U
Lead, Total	23.5 =	4.3 =	54.1 J	41.7 J	46.6 =	71.1 J
Lithium, Total	21.3 U	22.7 U	20.6 U	21.5 U	20.3 U	21.5 U
Lutetium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Magnesium, Total	1290 =	1850 =	1550 J	1470 J	2060 J	2240 J
Manganese, Total	113 =	153 =	132 J	144 J	192 J	262 J
Molybdenum, Total	21.3 U	22.7 U	20.6 U	21.5 U	20.3 U	21.5 U
Neodymium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Nickel, Total	8.5 U	10.9 =	6.1 B	4.9 B	8.9 =	8.6 B
Potassium, Total	1060 U	1140 U	168 U	176 U	226 B	175 U
Praseodymium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Samarium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Selenium, Total	1.1 U	1.0 U	0.50 B	0.44 B	0.46 B	1.4 =
Silver, Total	2.1 U	2.3 U	0.93 U	0.97 U	0.91 U	0.97 U
Sodium, Total	1060 U	1140 U	94 B	101 B	101 B	147 B
Tellurium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Terbium, Total	42.6 U	45.5 U	41.2 U	43.1 U	40.5 U	43.0 U
Thallium, Total	22.6 U	20.7 U	0.70 UJ	0.79 U	0.80 UJ	0.90 U
Thulium, Total	148 =	204 =	41.2 U	43.1 U	40.5 U	43.0 U
Vanadium, Total	15.7 =	11.4 U	11.4 =	11.4 =	13.4 =	17.3 =
Ytterbium, Total	43.0 U					
Zinc, Total	29.3 =	21.6 =	77.4 J	41.7 J	60.5 J	105 J

Concentration Units - mg/kg - milligrams per kilogram.

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= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

NOTE: Unreliable results identified as such mainly due to rejected matrix spike recovery and/or low (or high) CRDL recovery percentages.

Table F-16
(continued)

Page 4 of 4

Sample ID No.	138-MWC-045
Borehole ID No.	B3890C630
Sample Depth (ft)	8 - 10
Analyte	
Aluminum, Total	1740 J
Antimony, Total	4.1 U
Arsenic, Total	0.95 BJ
Barium, Total	61.0 J
Beryllium, Total	0.20 B
Boron, Total	19.9 U
Cadmium, Total	1.0 U
Calcium, Total	12600 J
Cerium, Total	39.8 U
Chromium, Total	4.4 R
Cobalt, Total	5.3 B
Copper, Total	5.4 =
Dysprosium, Total	39.8 U
Erbium, Total	39.8 U
Europium, Total	39.8 U
Gadolinium, Total	39.8 U
Holmium, Total	39.8 U
Iron, Total	3540 =
Lanthanum, Total	39.8 U
Lead, Total	7.37 BJ
Lithium, Total	19.9 U
Lutetium, Total	39.8 U
Magnesium, Total	1150 J
Manganese, Total	151 J
Molybdenum, Total	19.9 U
Neodymium, Total	39.8 U
Nickel, Total	5.9 B
Potassium, Total	162 U
Praseodymium, Total	39.8 U
Samarium, Total	39.8 U
Selenium, Total	0.39 UJ
Silver, Total	0.9 U
Sodium, Total	85.9 B
Tellurium, Total	39.8 U
Terbium, Total	39.8 U
Thallium, Total	0.78 U
Thulium, Total	39.8 U
Vanadium, Total	3.9 B
Ytterbium, Total	39.8 U
Zinc, Total	15.5 J

Concentration Units - mg/kg - milligrams per kilogram.

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U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

R - Unreliable result. Analyte may or may not be present in the sample.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

NOTE: Unreliable results identified as such mainly due to rejected matrix spike recovery and/or low (or high) CRDL recovery percentages.

Table F-17
Volatile Organic Compounds, Commercial/Governmental Vicinity Properties,
Soil Samples

Sample ID No. Borehole ID No. Sample Depth (ft)	138-MWC-015 83890C570 0 - 2		138-MWC-003 83890C530 4 - 6		138-MWC-033 83890C628 0 - 2	
Analyte						
1,1,1-TRICHLOROETHANE	6	UJ	6	U	6	U
1,1,2,2-TETRACHLOROETHANE	6	U	6	U	6	U
1,1,2-TRICHLOROETHANE	6	U	6	U	6	U
1,1-DICHLOROETHANE	6	U	6	U	6	U
1,1-DICHLOROETHYLENE	6	U	6	U	6	UJ
1,2-DICHLOROETHANE	6	U	6	U	6	UJ
1,2-DICHLOROETHENE (TOTAL)	6	U	6	UJ	6	UJ
1,2-DICHLOROPROPANE	6	U	6	U	6	UJ
2-BUTANONE	19	J	11	R	3	J
2-CHLOROETHYL VINYLETHER	12	U	11	U	12	UJ
2-HEXANONE	12	UJ	11	U	12	UJ
4-METHYL-2-PENTANONE	12	UJ	11	U	12	UJ
ACETONE	150	U	25	U	25	BJ
ACROLEIN	12	U	11	U	12	UJ
ACRYLONITRILE	12	U	11	U	12	UJ
BENZENE	6	U	6	U	6	UJ
BROMODICHLOROMETHANE	6	U	6	U	6	UJ
BROMOFORM	6	U	6	U	6	UJ
BROMOMETHANE	12	U	11	U	12	UJ
CARBON DISULFIDE	3	J	6	U	6	UJ
CARBON TETRACHLORIDE	6	UJ	6	U	6	UJ
CHLOROBENZENE	6	U	6	U	6	UJ
CHLOROETHANE	12	U	11	U	12	UJ
CHLOROFORM	6	U	6	U	6	UJ
CHLOROMETHANE	12	U	11	U	12	UJ
CIS-1,3-DICHLOROPROPENE	6	U	6	U	6	UJ
DIBROMOCHLOROMETHANE	6	U	6	U	6	UJ
ETHYLBENZENE	6	U	6	U	6	UJ
METHYLENE CHLORIDE	70	UJ	54	U	45	BJ
STYRENE	6	U	6	U	6	UJ
TETRACHLOROETHYLENE	6	J	1	J	6	UJ
TOLUENE	3	J	6	U	6	UJ
TRANS-1,3-DICHLOROPROPENE	6	U	6	U	6	UJ
TRICHLOROETHYLENE	6	U	6	U	1	J
VINYL ACETATE	12	U	11	U	12	UJ
VINYL CHLORIDE	12	U	11	U	12	UJ
XYLENES (TOTAL)	6	U	7	=	6	UJ

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

B - Reported value was less than the CRDL but greater than or equal to the IDL.

= - No data qualifier required.

Table F-18

BNAEs, Commercial/Governmental Vicinity Properties,
Soil Samples

Page 1 of 2

Sample ID No.	138-MWC-015		138-MWC-003		138-MWC-033
Borehole ID No.	B3890C570		B3890C530		B3890C628
Sample Depth (ft)	0 - 2		4 - 6		0 - 2
Analyte					
1,2,4-TRICHLOROBENZENE	390	U	830	UJ	380 UJ
1,2-DICHLOROBENZENE	390	U	830	UJ	380 UJ
1,2-DIPHENYLHYDRAZINE	390	U	830	U	380 U
1,3-DICHLOROBENZENE	390	U	830	UJ	380 UJ
1,4-DICHLOROBENZENE	390	U	830	UJ	380 UJ
2,4,5-TRICHLOROPHENOL	2000	U	4200	UJ	1900 UJ
2,4,6-TRICHLOROPHENOL	390	U	830	UJ	380 UJ
2,4-DICHLOROPHENOL	390	U	830	UJ	380 UJ
2,4-DIMETHYLPHENOL	390	U	830	UJ	380 UJ
2,4-DINITROPHENOL	2000	U	4200	UJ	1900 UJ
2,4-DINITROTOLUENE	390	U	830	UJ	380 UJ
2,6-DINITROTOLUENE	390	U	830	UJ	380 UJ
2-CHLORONAPHTHALENE	390	U	830	UJ	380 UJ
2-CHLOROPHENOL	390	U	830	UJ	380 UJ
2-METHYLNAPHTHALENE	390	U	830	UJ	380 UJ
2-METHYLPHENOL	390	U	830	UJ	380 UJ
2-NITROANILINE	2000	U	4200	UJ	1900 UJ
2-NITROPHENOL	390	U	830	UJ	380 UJ
3,3'-DICHLOROBENZIDINE	790	UJ	1700	U	760 UJ
3-NITROANILINE	2000	U	4200	UJ	1900 UJ
4,6-DINITRO-2-METHYLPHENOL	2000	U	4200	U	1900 UJ
4-BROMOPHENYL-PHENYLETHER	390	U	830	U	380 UJ
4-CHLORO-3-METHYLPHENOL	390	U	830	UJ	380 UJ
4-CHLOROANILINE	390	U	830	UJ	380 UJ
4-CHLOROPHENYL-PHENYLETHER	390	U	830	UJ	380 UJ
4-METHYLPHENOL	390	U	830	UJ	380 UJ
4-NITROANILINE	2000	U	4200	UJ	1900 UJ
4-NITROPHENOL	2000	U	4200	UJ	1900 UJ
ACENAPHTHENE	390	U	830	U	380 UJ
ACENAPHTHYLENE	390	U	830	U	380 UJ
ANTHRACENE	62	J	830	U	380 UJ
BENZIDINE	2000	UJ	4200	UR	1900 UJ
BENZO(A)ANTHRACENE	440	=	150	J	380 UJ
BENZO(A)PYRENE	460	J	200	J	380 UJ

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.
- B - Reported value was less than the CRDL but greater than or equal to the IDL.
- R - Unreliable result. Analyte may or may not be present in the sample.
- = - No data qualifier required.

Table F-18
(continued)

Page 2 of 2

Sample ID No.	138-MWC-015		138-MWC-003		138-MWC-033
Borehole ID No.	83890C570		83890C530		83890C628
Sample Depth (ft)	0 - 2		4 - 6		0 - 2
Analyte					
BENZO(B)FLUORANTHENE	530	J	190	J	380 UJ
BENZO(G,H,I)PERYLENE	180	J	97	J	380 UJ
BENZO(K)FLUORANTHENE	400	J	150	J	380 UJ
BENZOIC ACID	2000	U	4200	UJ	1900 UJ
BENZYL ALCOHOL	390	U	830	UJ	380 UJ
BIS(2-CHLOROETHOXY)METHANE	390	U	830	UJ	380 UJ
BIS(2-CHLOROETHYL)ETHER	390	U	830	UJ	380 UJ
BIS(2-CHLOROISOPROPYL)ETHER	390	U	830	UJ	380 UJ
BIS(2-ETHYLHEXYL)PHTHALATE	390	U	6100	=	380 U
BUTYLBENZYLPHthalATE	980	=	830	U	380 UJ
CHRYSENE	510	=	190	J	380 U
DI-N-BUTYLPHthalATE	6300	=	450	J	380 U
DI-N-OCTYLPHthalATE	390	UJ	830	U	380 UJ
DIBENZ(A,H)ANTHRACENE	390	UJ	830	U	380 UJ
DIBENZOFURAN	390	U	830	UJ	380 UJ
DIETHYLPHthalATE	390	U	830	UJ	380 UJ
DIMETHYLPHthalATE	390	U	830	UJ	380 UJ
FLUORANTHENE	1100	=	380	J	380 UJ
FLUORENE	390	U	830	UJ	380 UJ
HEXACHLOROBENZENE	390	U	830	U	380 UJ
HEXACHLOROBUTADIENE	390	U	830	UJ	380 UJ
HEXACHLOROCYCLOPENTADIENE	390	UJ	830	UJ	380 UJ
HEXACHLOROETHANE	390	U	830	UJ	380 UJ
INDENO(1,2,3-CD)PYRENE	160	J	830	U	380 UJ
ISOPHORONE	390	U	830	UJ	380 UJ
N-NITROSO-DI-N-PROPYLAMINE	390	U	830	UJ	380 UJ
N-NITROSODIMETHYLAMINE	390	UJ	830	U	380 UJ
N-NITROSODIPHENYLAMINE	390	U	830	U	380 U
NAPHTHALENE	390	U	830	UJ	380 UJ
NITROBENZENE	390	U	830	UJ	380 UJ
PENTACHLOROPHENOL	2000	U	4200	U	1900 UJ
PHENANTHRENE	290	J	160	J	39 J
PHENOL	390	U	830	UJ	380 UJ
PYRENE	950	=	260	J	66 J

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

B - The analyte is found in the associated blank as well as the sample.

R - Unreliable result. Analyte may or may not be present in the sample.

= - No data qualifier required.

Table F-19
PCBs, Commercial/Governmental Vicinity Properties,
Soil Samples

Page 1 of 3

Sample ID No.	138-MWC-016	138-MWC-018	138-MWC-017	138-MWC-001	138-MWC-002	138-MWC-004
Borehole ID No.	B3890C570	B3890C570	B3890C570	B3890C530	B3890C530	B3890C530
Sample Depth (ft)	2 - 4	6 - 7.2	4 - 6	0 - 2	2 - 4	4 - 6
Analyte						
AROCLOR-1016	45 U	43 U	46 U	490 UJ	42 U	48 U
AROCLOR-1221	45 U	43 U	46 U	490 UJ	42 U	48 U
AROCLOR-1232	45 U	43 U	46 U	490 UJ	42 U	48 U
AROCLOR-1242	45 U	43 U	46 U	490 UJ	42 U	48 U
AROCLOR-1248	45 U	43 U	46 U	490 UJ	42 U	48 U
AROCLOR-1254	91 U	87 U	92 U	990 U	84 U	96 U
AROCLOR-1260	91 U	87 U	92 U	990 U	84 U	96 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 J - Analyte present; reported as an estimated value.

Table F-19
(continued)

Page 2 of 3

Sample ID No.	138-MWC-020	138-MWC-021	138-MWC-022	138-MWC-034	138-MWC-035
Borehole ID No.	B3890C622	B3890C622	B3890C622	B3890C628	B3890C628
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	2 - 4	6 - 8
Analyte					
AROCLOR-1016	42 U	43 U	45 U	52 U	44 U
AROCLOR-1221	42 U	43 U	45 U	52 U	44 U
AROCLOR-1232	42 U	43 U	45 U	52 U	44 U
AROCLOR-1242	42 U	43 U	45 U	52 U	44 U
AROCLOR-124B	42 U	43 U	45 U	52 U	44 U
AROCLOR-1254	14 J	87 U	89 U	100 U	88 U
AROCLOR-1260	85 U	87 U	89 U	100 U	88 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
J - Analyte present; reported as an estimated value.

Table F-19

(continued)

Page 3 of 3

Sample ID No.	138-MWC-041	138-MWC-042	138-MWC-043	138-MWC-044	138-MWC-045
Borehole ID No.	B3890C630	B3890C630	B3890C630	B3890C630	B3890C630
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8	8 - 10
Analyte					
AROCLOR-1016	45 U	45 U	47 U	52 UJ	44 U
AROCLOR-1221	45 U	45 U	47 U	52 UJ	44 U
AROCLOR-1232	45 U	45 U	47 U	52 UJ	44 U
AROCLOR-1242	45 U	45 U	47 U	52 UJ	44 U
AROCLOR-1248	45 U	45 U	47 U	52 UJ	44 U
AROCLOR-1254	90 U	91 U	94 U	100 UJ	87 U
AROCLOR-1260	90 U	91 U	94 U	100 UJ	87 U

Concentration Units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

Table F-20
Pesticides/PCBs, Commercial/Governmental Vicinity Properties,
Soil Samples

Page 1 of 2

Sample ID No.	138-MWC-015		138-MWC-003	
Borehole ID No.	B3890C570		B3890C530	
Sample Depth (ft)	0 - 2		4 - 6	
Analyte				
4,4'-DDD	4.3	J	19	U
4,4'-DDE	9.4	U	19	U
4,4'-DDT	9.4	U	19	UJ
ALDRIN	4.7	U	9.7	U
ALPHA CHLORDANE	47	U	97	U
ALPHA-BHC	4.7	U	9.7	U
AROCLOR-1016	47	U	97	U
AROCLOR-1221	47	U	97	U
AROCLOR-1232	47	U	97	U
AROCLOR-1242	47	U	97	U
AROCLOR-1248	47	U	97	U
AROCLOR-1254	94	U	190	U
AROCLOR-1260	94	U	190	U
BETA-BHC	4.7	UJ	9.7	UJ
DELTA-BHC	4.7	U	9.7	U
DIELDRIN	9.4	U	19	U
ENDOSULFAN I	4.7	U	9.7	U
ENDOSULFAN II	9.4	U	19	U
ENDOSULFAN SULFATE	9.4	U	19	U
ENDRIN	9.4	U	19	U
ENDRIN ALDEHYDE	9.4	U	19	U
ENDRIN KETONE	9.4	U	19	U
GAMMA CHLORDANE	47	U	97	U
GAMMA-BHC (LINDANE)	4.7	U	9.7	U
HEPTACHLOR	4.7	U	9.7	U
HEPTACHLOR EPOXIDE	4.7	U	9.7	U
METHOXYCHLOR	47	U	97	U
TOXAPHENE	94	U	190	U

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table F-20
(continued)

Page 2 of 2

Sample ID No.	138-MWC-033
Borehole ID No.	B3890C628
Sample Depth (ft)	0 - 2

Analyte		
4,4'-DDD	18	UJ
4,4'-DDE	18	UJ
4,4'-DDT	18	UJ
ALDRIN	9.2	U
ALPHA CHLORDANE	92	UJ
ALPHA-BHC	9.2	U
AROCLOR-1016	92	U
AROCLOR-1221	92	U
AROCLOR-1232	92	U
AROCLOR-1242	92	U
AROCLOR-1248	92	U
AROCLOR-1254	180	U
AROCLOR-1260	180	U
BETA-BHC	9.2	UJ
DELTA-BHC	9.2	UJ
DIELDRIN	18	U
ENDOSULFAN I	9.2	U
ENDOSULFAN II	18	U
ENDOSULFAN SULFATE	18	UJ
ENDRIN	18	U
ENDRIN ALDEHYDE	18	U
ENDRIN KETONE	18	U
GAMMA CHLORDANE	92	UJ
GAMMA-BHC (LINDANE)	9.2	U
HEPTACHLOR	9.2	U
HEPTACHLOR EPOXIDE	9.2	U
METHOXYCHLOR	92	UJ
TOXAPHENE	180	U

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
 J - Analyte present; reported as an estimated value.
 UJ - Analyte was analyzed for but not detected, but must be estimated due to quality control considerations.

Table F-21
Total Petroleum Hydrocarbons,
Commercial/Governmental Vicinity Properties, Soil Samples

Sample ID No.	Borehole ID No.	Sample Depth (ft)	Concentration (mg/kg)	Flag
138-MWC-020	B3890C622	0-2	220	=
138-MWC-022	B3890C622	4-6	69	=
138-MWC-015	B3890C570	0-2	1800	=
138-MWC-016	B3890C570	2-4	27	=
138-MWC-017	B3890C570	4-6	2.4	J
138-MWC-018	B3890C570	6-7.2	340	=
138-MWC-001	B3890C530	0-2	30	=
138-MWC-002	B3890C530	2-4	370	=
138-MWC-003	B3890C530	4-6	3400	=
138-MWC-004	B3890C530	6-8	330	=
138-MWC-021	B3890C622	2-4	3.8	J
138-MWC-033	B3890C628	0-2	1900	=
138-MWC-034	B3890C628	2-4	500	=
138-MWC-035	B3890C628	6-8	16	=
138-MWC-041	B3890C630	0-2	66	=
138-MWC-042	B3890C630	2-4	140	=
138-MWC-043	B3890C630	4-6	25	=
138-MWC-044	B3890C630	6-8	130	=
138-MWC-045	B3890C630	8-10	43	=

Concentration units mg/kg - milligrams per kilogram.

J - estimated value.

= - No data qualifier required.

Table F-22
 TCLP Metals, Commercial/Governmental Vicinity Properties,
 Soil Samples

Page 1 of 4

Sample ID No.	138-MWC-015	138-MWC-016	138-MWC-017	138-MWC-018	138-MWC-001	138-MWC-002
Borehole ID No.	83890C570	83890C570	83890C570	83890C570	83890C530	83890C530
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 7.2	0 - 2	2 - 4
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	737 =	1210 =	1450 =	1270 =	1200 =	1020 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	11.0 =	10.0 U
Lead, TCLP Leachate	500 U	500 U	500 U	510 =	500 U	500 U
Mercury, TCLP Leachate	0.25 U	0.25 U	0.25 U	0.25 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table F-22
(continued)

Page 2 of 4

Sample ID No.	138-MWC-C003	138-MWC-004	138-MWC-020	138-MWC-021	138-MWC-022	138-MWC-033
Borehole ID No.	B3890C530	B3890C530	B3890C622	B3890C622	B3890C622	B3890C628
Sample Depth (ft)	4 - 6	6 - 8	0 - 2	2 - 4	4 - 6	0 - 2
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	1100 =	943 =	1130 =	787 =	383 =	423 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	10.0 U	10.6 =	10.0 U	10.0 U	10.0 U	10.0 U
Lead, TCLP Leachate	500 U	500 U	1040 =	90.0 U	90.0 U	90.0 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	100 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.
 = - No data qualifier required.

Table F-22
(continued)

Page 3 of 4

Sample ID No.	138-MWC-034	138-MWC-035	138-MWC-041	138-MWC-042	138-MWC-043	138-MWC-044
Corehole ID No.	B3890C628	B3890C628	B3890C630	B3890C630	B3890C630	B3890C630
Sample Depth (ft)	2 - 4	6 - 8	0 - 2	2 - 4	4 - 6	6 - 8
Analyte						
Arsenic, TCLP Leachate	500 U	500 U	500 U	500 U	500 U	500 U
Barium, TCLP Leachate	2120 =	1350 =	1420 =	1430 =	1240 =	994 =
Cadmium, TCLP Leachate	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chromium, TCLP Leachate	22.2 =	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Lead, TCLP Leachate	90.0 U	90.0 U	90.0 U	90.0 U	90.0 U	90.0 U
Mercury, TCLP Leachate	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
Selenium, TCLP Leachate	100 U	100 U	100 U	100 U	100 U	100 U
Silver, TCLP Leachate	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U

Concentration Units - µg/L - micrograms per liter.

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- = - No data qualifier required.

Table F-22
(continued)

Page 4 of 4

Sample ID No.	138-MWC-045
Borehole ID No.	B3890C630
Sample Depth (ft)	8 - 10

Analyte

Arsenic, TCLP Leachate	500	U
Barium, TCLP Leachate	1170	=
Cadmium, TCLP Leachate	7.6	=
Chromium, TCLP Leachate	10.0	U
Lead, TCLP Leachate	90.0	U
Mercury, TCLP Leachate	0.20	U
Selenium, TCLP Leachate	100	U
Silver, TCLP Leachate	10.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

Table F-23
TCLP Volatile Organic Compounds, Commercial/Governmental Vicinity Properties,
Soil Samples

Sample ID No.	138-MWC-020		138-MWC-021		138-MWC-022	
Borehole ID No.	83890C622		83890C622		83890C622	
Sample Depth (ft)	2 - 4		4 - 6		6 - 8	
Analyte						
1,1-DICHLOROETHYLENE	50	U	50	U	50	U
1,2-DICHLOROETHANE	50	U	50	U	50	U
2-BUTANONE	100	U	100	U	100	U
BENZENE	50	U	50	U	50	U
CARBON TETRACHLORIDE	50	U	50	U	50	U
CHLOROBENZENE	50	U	50	U	50	U
CHLOROFORM	50	U	50	U	50	U
TETRACHLOROETHYLENE	50	U	50	U	50	U
TRICHLOROETHYLENE	50	U	50	U	50	U
VINYL CHLORIDE	100	U	100	U	100	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table F-24
TCLP BMAEs, Commercial/Governmental Vicinity Properties,
Soil Samples

Sample ID No.	138-MWC-020		138-MWC-021		138-MWC-022	
Borehole ID No.	83890C622		83890C622		83890C622	
Sample Depth (ft)	2 - 4		4 - 6		6 - 8	
Analyte						
1,4-DICHLOROBENZENE	55	U	80	U	55	U
2,4,5-TRICHLOROPHENOL	280	U	400	U	280	U
2,4,6-TRICHLOROPHENOL	55	U	80	U	55	U
2,4-DINITROTOLUENE	55	U	80	U	55	U
2-METHYLPHENOL	55	U	80	U	55	U
4-METHYLPHENOL	55	U	80	U	55	U
HEXACHLOROBENZENE	55	U	80	U	55	U
HEXACHLOROBUTADIENE	55	U	80	U	55	U
HEXACHLOROETHANE	55	U	80	U	55	U
NITROBENZENE	55	U	80	U	55	U
PENTACHLOROPHENOL	280	U	400	U	280	U
PYRIDINE	55	U	80	U	55	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table F-25
 TCLP Pesticides, Commercial/Governmental Vicinity Properties,
 Soil Samples

Sample ID No.	138-MWC-020		138-MWC-021		138-MWC-022	
Borehole ID No.	B3890C622		B3890C622		B3890C622	
Sample Depth (ft)	2 - 4		4 - 6		6 - 8	
Analyte						
ALPHA CHLORDANE	1.2	U	1.2	U	1.0	U
ENDRIN	0.24	U	0.24	U	0.20	U
GAMMA CHLORDANE	1.2	U	1.2	U	1.0	U
GAMMA-BHC (LINDANE)	0.12	U	0.12	U	0.10	U
HEPTACHLOR	0.12	U	0.12	U	0.10	U
METHOXYCHLOR	1.2	U	1.2	U	1.0	U
TOXAPHENE	2.4	U	2.4	U	2.0	U

Concentration Units - $\mu\text{g/L}$ - micrograms per liter.

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

Table F-26
Corrosivity/Reactivity, Commercial/Governmental Vicinity Properties,
Soil Samples

Page 1 of 4

	138-MWC-015	138-MWC-016	138-MWC-017	138-MWC-018	138-MWC-001	138-MWC-002
Sample ID No.	B3890C570	B3890C570	B3890C570	B3890C570	B3890C530	B3890C530
Borehole ID No.						
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 7.2	0 - 2	2 - 4
Analyte						
Corrosivity by pH	7.6 =	7.6 =	5.8 =	7.2 U	6.6 =	7.1 =
Cyanide, Total	1.1 U	1.1 U	1.2 U	1.1 U	1.4 U	1.1 U
Sulfide	0.28 U	0.29 U	0.29 U	0.27 U	0.34 U	0.29 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

NR - Analysis not requested.

= - No data qualifier required.

Table F-26
(continued)

Page 2 of 4

Sample ID No.	138-MWC-003	138-MWC-004	138-MWC-020	138-MWC-021	138-MWC-022	138-MWC-033
Borehole ID No.	B3890C530	B3890C530	B3890C622	B3890C622	B3890C622	B3890C628
Sample Depth (ft)	4 - 6	6 - 8	0 - 2	2 - 4	4 - 6	0 - 2
Analyte						
Corrosivity by pH	7.1 =	6.1 =	6.4 =	5.2 =	6.1 =	7.1 =
Cyanide, Total	1.2 U	1.4 U	1.1 U	NR	1.1 U	1.2 U
Sulfide	0.29 U	0.34 U	0.28 U	NR	0.29 U	0.30 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

NR - Analysis not requested.

= - No data qualifier required.

Table F-26

(continued)

Page 3 of 4

Sample ID No.	138-MWC-034	138-MWC-035	138-MWC-041	138-MWC-042	138-MWC-043	138-MWC-044
Borehole ID No.	B3890C628	B3890C628	B3890C630	B3890C630	B3890C630	B3890C630
Sample Depth (ft)	2 - 4	6 - 8	0 - 2	2 - 4	4 - 6	6 - 8
<hr/>						
Analyte						
Corrosivity by pH	6.5 =	7.3 =	8.0 =	8.0 =	8.9 =	9.4 =
Cyanide, Total	1.3 U	1.1 U	1.1 U	1.1 U	1.2 U	1.3 U
Sulfide	0.33 U	0.29 U	0.28 U	0.28 U	0.31 U	0.34 U

Concentration Units - mg/kg - milligrams per kilogram (cyanide, sulfide) - pH in pH units.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

NR - Analysis not requested.

= - No data qualifier required.

Table F-26
(continued)

Page 4 of 4

Sample ID No.	138-MWC-045
Borehole ID No.	B3890C630
Sample Depth (ft)	8 - 10

Analyte

Corrosivity by pH	8.5	=
Cyanide, Total	1.1	U
Sulfide	0.28	U

Concentration Units - mg/kg - milligrams
per kilogram (cyanide, sulfide) - pH in
pH units.

U - The analyte was not detected. The
minimum detection limit for the sample
is reported.

NR - Analysis not requested.

= - No data qualifier required.

Table F-27
Mobile Ions, Commercial/Governmental Vicinity Properties,
Soil Samples

Page 1 of 4

Sample ID No.	138-MWC-015	138-MWC-016	138-MWC-017	138-MWC-018
Borehole ID No.	B3890C570	B3890C570	B3890C570	B3890C570
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 7.2
Analyte				
% Solids	87.2 =	92.2 =	85.7 =	88.9 =
Chloride ^a	74.6 =	57.4 U	58.4 U	27.1 U
Nitrate, as N ^a	1.1 U	1.1 U	1.3 =	1.9 =
Phosphate, as P ^a	629 =	433 =	517 =	716 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table F-27
(continued)

Page 2 of 4

Sample ID No.	138-MWC-001	138-MWC-002	138-MWC-003	138-MWC-004	138-MWC-020
Well ID No.	B3890C0530	B3890C530	B3890C530	B3890C530	B3890C622
Sample Depth (ft)	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2
Analyte					
Total Solids	74.0 =	87.2 =	86.9 =	73.4 =	88.3 =
Chloride ^a	33.8 U	28.7 U	28.8 U	34.1 U	56.6 U
Ammonia Nitrate, as N ^a	6.8 =	2.0 =	0.75 =	1.1 =	2.7 =
Orthophosphate, as P ^a	575 =	265 =	352 =	581 =	582 =

Concentration Units - mg/kg - milligrams per kilogram.

- The analyte was not detected. The minimum detection limit for the sample is reported.
- No data qualifier required.
- Analysis not requested.

Table F-27
(continued)

Page 3 of 4

Sample ID No.	138-MWC-021	138-MWC-022	138-MWC-033	138-MWC-034
Borehole ID No.	B3890C0622	B3890C622	B3890C628	B3890C628
Sample Depth (ft)	0 - 2	2 - 4	0 - 2	0 - 2
Analyte				
% Solids	89.4 =	87.6 =	83.9 =	76.0 =
Chloride ^a	NR	57.1 U	59.6 U	165 =
Nitrate, as N ^a	NR	1.1 U	1.0 U	1.3 U
Phosphate, as P ^a	240 =	368 =	450 =	463 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Table F-27
(continued)

Page 4 of 4

Sample ID No.	138-MWC-035	138-MWC-041	138-MWC-042	138-MWC-043	138-MWC-044	138-MWC-045
Borehole ID No.	B3890C0628	B3890C630	B3890C630	B3890C630	B3890C630	B3890C630
Sample Depth (ft)	6 - 8	0 - 2	2 - 4	4 - 6	6 - 8	8 - 10
Analyte						
% Solids	87.3 =	89.5 =	87.7 =	80.5 =	74.6 =	89.5 =
Chloride ^a	180 =	99.5 =	57.0 U	64.8 =	106 =	66.5 =
Nitrate, as N ^a	1.3 =	1.5 =	1.7 =	2.9 =	1.6 =	1.7 =
Phosphate, as P ^a	445 =	397 =	374 =	585 =	621 =	306 =

^a - Concentration Units - mg/kg - milligrams per kilogram.

U - The analyte was not detected. The minimum detection limit for the sample is reported.

= - No data qualifier required.

NR - Analysis not requested.

Geologic Logs



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R536				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
Sears; 200 St. Rt. 17			N 8,160.0; E 10,915.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-1-90	11-1-90	Hydro Group, Inc.		Tripod		3.5"	9.4	0.0	9.4			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.9/84*		0	5	NA	44.0	V / - 8' ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knuttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	4 8 10 18				44.0			0.0 - 1.5 ft: Sandy SILT, (ML); Blackish red (5R2/2), minor roots present, moderately firm, moist.	Complete borehole number is B3890R536.	
SS	2.0	1.5	4 8 10 18				42.5 42.0			2.0 - 3.5 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained, moderately sorted, dirty, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.7	10 15 18 22				40.5 40.0		5	4.0 - 5.7 ft: SAND, (SW); Moderate reddish brown (10R4/6), fine to medium grained, poorly sorted, with some thin interlayered clay and silt layers, minor pebbles up to 1 cm present, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.	
SS	2.0	1.8	6 10 12 20				38.3 38.0			6.0 - 9.2 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained, moderately sorted, dirty, with minor subrounded pebbles up to 0.5 cm common, firm, moist.		
SS	1.4	1.4	8 27 50/5"				36.2 36.0					
							34.8 34.0			9.2 - 9.4 ft: Interlayered SAND and SILT, (SP & ML); Moderate brown (5YR4/4), very fine grained, moderately well sorted, layers -0.5 - 1 cm thick, firm, moist.	Spoon refusal at 9.4'. Borehole enlarged by driving 3.5" OD split spoon to depth.	
TOTAL DEPTH = 9.4 FT.										3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole backfilled with drilling spoils.		

(Template: MYWD)

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; 0 = OTHER

SITE

Sears; 200 St. Rt. 17

Last Update:
10-08-92

HOLE NO.
R536



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			COORDINATES	14501	1 OF 1	R537
Sears; 200 St. Rt. 17			N 8100.0; E 10975.0	ANGLE FROM HORIZ		BEARING
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
11-1-90	11-1-90	Hydro Group, Inc.	Tripod	3.5"	10.4	1.6
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
8.8/73*		0	6	NA	44.0	↓ / -11' ATD
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.0	3 7 11 32					44.0 43.5 43.0		0.0 - 0.5 ft: TOPSOIL, (SM); Grayish black (N2), abundant roots present.	Complete borehole number is B3890R537. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 10.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS	2.0	1.1	6 6 18 22					42.0 40.9		0.5 - 1.0 ft: Sandy GRAVEL, (GW); Blackish red (5R2/2), gravel is sandstone, minor silt and clay present, moderately firm, moist.		
SS	2.0	1.4	28 21 20 20					40.0 38.6	5	2.0 - 3.1 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, minor angular sandstone gravel, some clayey layers present, firm, moist.		
SS	2.0	1.5	20 10 15 15					38.0 36.5		4.0 - 9.8 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), fine to medium sand, moderately sorted; gravel is angular, sandstone, content decreasing with depth; some sediment clasts composed of Clayey Silt, Grayish black (N2), present between 8.0 - 9.8'; firm, moist.		
SS	2.0	1.8	9 11 24 27					36.0				
SS	2.0	2.0	18 15 18 18					34.2 34.0 33.6	10	10.4 - 12.0 ft: Gravelly SAND, (SW); Blackish red (5R2/2) changing to Dark reddish brown (10R3/4) at 10.5', with fine roots present between 10.4 - 10.5'; sand is fine to medium grained, moderately sorted; gravel is angular, weathered, sandstone; firm, moist.		
								32.0		TOTAL DEPTH = 12.0 FT.		

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R537
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R538
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Sears; 200 St. Rt. 17			N 8200.0; E 10850.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-1-90	11-1-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.7/71*		0	4	NA	45.0	-7' ATD		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	1.8	1.2	27/4"					45.0				(Template: NYWD)	
			24					44.9				0.0 - 0.2 ft: ASPHALT, over gravel.	Complete borehole number is B3890R538.
			17					44.8				0.2 - 1.2 ft: SAND, (SW); Grayish Brown (5YR3/2), fine grained, moderately sorted, firm, moist.	
			11					43.8				1.2 - 2.2 ft: Sandy SILT, (ML); Grayish black (N2), minor sandstone gravel, firm, moist.	Asphalt broken with split spoon prior to sampling.
			14					43.6				2.2 - 5.6 ft: SAND, (SW); Dusky yellow green (5GY5/2) with mottling of Grayish red (5R4/2), fine grained, moderately sorted; minor silt and subrounded pebbles up to 1 cm between 4.0 - 5.6'; firm, moist.	
SS	2.0	1.7	18					43.0					Borehole sampled and gamma-logged by TMA/Eberline Corp.
			17					42.8					
			12					41.3					Hole advanced to depth by 3" OD split spoon samplers.
			15					41.0					
			15										Borehole enlarged by driving 3.5" OD split spoon to depth.
			19					39.4					
			20					39.0					3" PVC casing inserted to 4.0' for gamma-logging.
			9					38.7					
SS	2.0	1.2	9					37.8				6.0 - 6.3 ft: SILT, (ML); Pale brown (5YR5/2), firm, moist.	PVC casing was removed after logging and hole was grouted to -1' below surface and remaining hole backfilled with drilling spoils.
			12					37.8				6.3 - 7.2 ft: SAND, (SP); Moderate brown (5YR4/4), fine grained, finely layered, moderately well sorted to well sorted within the layers, firm, moist.	
			9					37.0					* Core recovery refers to total soil & rock sample.
			16										
TOTAL DEPTH = 8.0 FT.												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update:	03-19-92	HOLE NO.	R538
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			FUSRAP	14501	1 OF 1	R539
Sears; 200 St. Rt. 17			COORDINATES	ANGLE FROM HORIZ		BEARING
			N 8150.0; E 10850.0	Vertical		-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
11-1-90	11-1-90	Hydro Group, Inc.	Tripod	3.5"	8.0	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
6.1/76*		0	4	NA	43.5	DEPTH/EL. TOP OF ROCK
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>		

SAMP. AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.5	40						43.5				(Template: MYWD)	
			45						43.3				0.0 - 0.4 ft: ASPHALT, over sand and gravel.	Complete borehole number is B3890R539.
			28						42.0				0.4 - 2.2 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained, moderately sorted, with minor silt and fine pebbles, firm, moist.	Sampled through asphalt with split spoon.
SS	2.0	1.6	20						41.5				2.2 - 2.6 ft: SAND, (SP); Grayish green (10GY5/2), fine grained, moderately well sorted, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			29						41.3				2.6 - 4.4 ft: SAND interlayered with Silty SAND, (SP & SM); Light brown (5YR5/6) mottled with Moderate yellowish brown (5YR5/6), sand is fine grained, moderately to well sorted, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
			23						40.9				4.4 - 4.5 ft: GRAVEL, (GW); Grayish black (N2), fine, loose, moist.	
SS	2.0	1.5	12						39.9				4.5 - 5.5 ft: SILT, (ML); Moderate brown (5YR4/4) to light brown (5YR4/4), minor very fine sand, slightly plastic, firm, moist.	
			10						39.5				6.0 - 7.5 ft: Interlayered SAND and SILT, (SP & ML); Dark yellowish brown (10YR4/2) to Moderate yellowish brown (10YR5/4), sand is fine to very fine grained, finely layered, moderately well to well sorted within the layers, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
			12						39.1					3" PVC casing inserted to 4.5' for gamma-logging.
			12						39.0					PVC casing was removed after logging and hole was backfilled with drilling spoils.
			19						38.0					
SS	2.0	1.5	7						37.5					
			13						36.0					
			15						35.5					
			19											
												TOTAL DEPTH = 8.0 FT.		
													* Core recovery refers to total soil & rock sample.	
													Ground elevation estimated from site topographic map.	
													Description & classification by visual examination of sample.	
													Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; 0 = OTHER

SITE
Sears; 200 St. Rt. 17

Last Update: 03-19-92
HOLE NO. R539



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R540	
SITE Sears; 200 St. Rt. 17			COORDINATES N 8145.0; E 10805.0			ANGLE FROM HORIZ Vertical		BEARING -----	
BEGUN 11-1-90	COMPLETED 11-1-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 8.0	ROCK (FT.) 0.0	TOTAL DEPTH 8.0
CORE RECOVERY (FT./%) 5.6/70*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 44.0	DEPTH/EL. GROUND WATER 5' / -5' ATD		DEPTH/EL. TOP OF ROCK NA/NA	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel				

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	16 28 27 27				44.0 43.9 43.7 42.6 42.5 42.0				0.0 - 0.3 ft: ASPHALT; over sand and gravel. 0.3 - 1.4 ft: SAND, (SW); Moderate brown (5YR4/4), fine to medium grained, poorly to moderately sorted, firm, moist; layer of Silty Sand, Grayish black (N2), between 0.4 - 0.6'. 1.4 - 1.5 ft: SAND, (SP); Grayish olive (10Y4/2), fine grained, moderately well sorted, firm, moist. 2.0 - 5.4 ft: SAND, (SW); Grayish brown (5YR3/2), fine grained, moderately sorted, with minor subrounded pebbles up to 0.5 cm, firm, moist, wet between 4.0 - 5.4'. 5.4 - 7.2 ft: SILT, (ML); Moderate brown (5YR4/4) to Light brown (5YR5/6), slightly plastic, firm, moist.	Complete borehole number is B3890R540. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.3	21 21 21 21				40.7 40.0					
SS	2.0	1.6	20 28 27 15				38.6 38.4 38.0	5				
SS	2.0	1.2	12 10 17 19				36.8 36.0					
TOTAL DEPTH = 8.0 FT.											Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R540
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE Sears; 200 St. Rt. 17				COORDINATES N 8100.0; E 10850.0		14501	1 OF 1	R541				
BEGUN 11-2-90	COMPLETED 11-2-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0	TOTAL DEPTH 6.0				
CORE RECOVERY (FT./%) 4.0/67*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 44.0	DEPTH/EL. GROUND WATER / none ATD / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	CORE RECOVERY	WATER TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.							TIME MIN.
SS	2.0	1.2	27 24 24 32				44.0 43.8 42.8 42.0 41.4 41.3 40.4 40.0	5			0.0 - 0.2 ft: ASPHALT. 0.2 - 1.2 ft: Sandy GRAVEL, (GW); Moderate brown (5YR4/4), mixed with Clayey Silt, Grayish black (N2). 2.0 - 2.6 ft: SAND, (SW); Moderate brown (5YR5/4), fine grained, moderately sorted, rounded pebbles up to 0.5 cm. firm, moist. 2.6 - 2.7 ft: Silty SAND, (SM); Black (N2), sand is fine grained, moderately well sorted, firm, moist. 2.7 - 3.6 ft: SAND, (SW); Pale yellowish brown (10YR6/2), fine grained, moderately sorted, minor silt and subrounded to subangular pebbles, firm, moist. 4.0 - 5.2 ft: SAND interlayered with Silty SAND, (SP & SM); Moderate brown (5YR4/4) to Light brown (5YR5/6), sand is very fine grained, well sorted within the layers, minor rounded fine pebbles, firm, moist.	Complete borehole number is B3890R541. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 3.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 6.0 FT.												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER												
SITE Sears; 200 St. Rt. 17						Last Update: 03-19-92		HOLE NO. R541				



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP		14501	1 OF 1	R542		
SITE			COORDINATES				ANGLE FROM HORIZ	BEARING		
Sears; 200 St. Rt. 17			N 8100.0; E 10900.0				Vertical	-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
11-2-90	11-2-90	Hydro Group, Inc.		Tripod		3.5"	6.4	0.0	6.4	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.6/72*		0	4	NA	44.0	V / none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in			none			Stephen Knuttel				
(Template: MYWD)										
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.4	20 48 10 11			44.0 43.8 42.6 42.0 41.1 40.2 40.0 39.4 38.9 38.0 37.7 37.6	5		0.0 - 0.2 ft: ASPHALT. 0.2 - 0.4 ft: SAND, (SW); Dark reddish brown (5YR3/2), fine grained. 0.4 - 1.4 ft: SILT, (ML); Black (N1), minor very fine sand, roots and wood fragments present, firm, slightly moist. 2.0 - 2.9 ft: SAND, (SW); Black (N1), fine to medium grained, poorly sorted; minor silt, roots and wood fragments; loose, moist. 2.9 - 3.8 ft: SAND, (SW); Moderate brown (5YR3/4), fine grained, moderately sorted, minor subrounded pebbles up to 0.5 cm; sedimentary clasts composed of clay present between 2.9 - 3.2'; firm, moist. 4.0 - 4.6 ft: SAND, (SP); Moderate brown (5YR4/4), very fine grained, well sorted, increasing silt with depth, firm, wet. 4.6 - 5.1 ft: SILT, (ML); Moderate brown (5YR4/4), firm, moist. 6.0 - 6.3 ft: Gravelly SILT, (GM); Moderate reddish brown (10R3/4), sandstone fragments with silt.	Complete borehole number is B3890R542. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Spoon refusal at 6.4'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was grouted to -3' below surface and remaining hole backfilled with drilling spoils.
TOTAL DEPTH = 6.4 FT.										
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER										
SITE						Sears; 200 St. Rt. 17		Last Update: 03-19-92		HOLE NO. R542



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R543
SITE Sears; 200 St. Rt. 17		COORDINATES N 8250.0; E 10750.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 11-5-90	COMPLETED 11-5-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 8.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 5.8/73*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 45.5	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLDS. % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.5	42 40 32 32				45.5 45.0 44.0 43.5 43.1				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 2.4 ft: SAND, (SW); Moderate brown (5YR3/4), medium grained, poorly sorted, loose, slightly moist.	Complete borehole number is B3890R543. Sampled through asphalt with split spoon.
SS	2.0	1.6	6 7 13 18				42.5 42.3 41.9 41.6				2.4 - 3.0 ft: Clayey SILT, (ML); Black (N1), roots present, slightly plastic, firm, moist. 3.0 - 3.2 ft: CLAY, (CL); Grayish black (N2), plastic, firm, moist, sharp contact with layer below.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	14 8 13 14				40.5 40.4 39.5 38.9	5			3.2 - 5.0 ft: Clayey SAND to SAND, (SC-SP); Light olive gray (5Y5/2) changing to Grayish olive (10Y4/2) at 4.0', interlayered clays, silts and very fine to fine grained sands, moderately sorted; clayey layers are slightly to moderately plastic; firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.6	7 8 9 11				37.9 37.5				5.0 - 6.6 ft: SAND, (SW); Moderate brown (5YR3/4), fine grained; medium grained with rounded pebbles up to 1 cm between 5.0 - 5.1'; moderately sorted, firm, moist. 6.6 - 7.6 ft: SILT, (ML); Grayish red (5R4/2), slightly interlayered with above, slightly plastic, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R543
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
Sears; 200 St. Rt. 17			FUSRAP	14501	1 OF 1	R544
COORDINATES			N 8252.0; E 10549.0		ANGLE FROM HORIZ	BEARING
BEGUN			DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
11-5-90			Tripod	3.5"	9.2	0.0
COMPLETED			GROUND EL.		DEPTH/EL. GROUND WATER	TOTAL DEPTH
11-5-90			47.0		7' ATD	9.2
DRILLER			EL. TOP CASING		DEPTH/EL. TOP OF ROCK	
Hydro Group, Inc.			NA		NA/NA	
CORE RECOVERY (FT./%)			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:	
6.9/75*			0 5		Stephen Knuttel	
SAMPLE HAMMER WEIGHT/FALL			none			
140 lbs/30 in						

SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.5	14				47.0					0.0 - 0.7 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R544.
			31				46.8					0.7 - 1.3 ft: Sandy SILT, (ML); Grayish black (N2), minor roots and debris present, firm, moist.	
			14				45.7					1.3 - 1.5 ft: SAND, (SW); Moderate brown (5YR3/4), fine grained, moderately sorted, firm, moist.	Sampled through asphalt with split spoon.
			10				45.5					2.0 - 4.7 ft: Sandy, Clayey SILT, (ML); Black (N1), abundant root and wood fragments present, moderately plastic, firm, moist.	
SS	2.0	1.4	7				43.6					4.7 - 5.1 ft: Silty CLAY, (CL); Grayish black (N2), minor roots, plastic, moderately firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			10				43.0					6.0 - 6.7 ft: Clayey SILT, (ML); Grayish olive (10Y4/2), moderately plastic, moderately firm, moist.	
			11				42.4					6.7 - 7.7 ft: SAND, (SW); Grayish brown (5YR3/2), medium grained, moderately sorted, minor clay and pebbles below 7.3', moderately firm to firm with depth, wet.	Hole advanced to depth by 3" OD split spoon samplers.
			9				41.9	5				8.0 - 9.0 ft: SILT, (ML); Grayish brown (5YR3/2), firm, slightly moist.	
SS	2.0	1.1	7				41.0					9.0 - 9.2 ft: SAND, (SP); Moderate brown (5YR3/4); minor Dark reddish brown (10R3/4) sandstone fragments at 9.2'; medium to coarse grained, moderately well sorted, clean, loose, wet.	Spoon refusal at 9.2'. Borehole enlarged by driving 3.5" OD split spoon to depth.
			6				40.3					TOTAL DEPTH = 9.2 FT.	
			5				39.3						3" PVC casing inserted to 7.0' for gamma-logging.
			6				39.0						
			10				38.0						PVC casing was removed after logging and hole was backfilled with drilling spoils.
			7				37.8						
			16										* Core recovery refers to total soil & rock sample.
			25										
			35										Ground elevation estimated from site topographic map.
			50/3"										
													Description & classification by visual examination of sample.
													Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Sears; 200 St. Rt. 17

Last Update:
03-19-92

HOLE NO.
R544



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R545
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Sears; 200 St. Rt. 17			N 8303.0; E 10650.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-5-90	11-5-90	Hydro Group, Inc.	Tripod	3.5"	8.0	0.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.5/69*		0	4	NA	46.5	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.6	20 27 14 7				46.5 46.3				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R545.
							45.3 44.9 44.5				0.2 - 1.2 ft: GRAVEL and SAND, (GW); Grayish black (N2), minor slag fragments, vitreous, present (Fill?).	
SS	2.0	1.1	16 9 12 7				43.6 43.4				1.2 - 2.9 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted, gravel is sandstone, minor silt, firm, slightly moist.	Sampled through asphalt with split spoon.
SS	2.0	1.4	5 5 12 14				42.5 42.1 41.8 41.6 41.1				2.9 - 3.1 ft: Silty CLAY, (CL); Black (N1) finely layered with Medium light gray (N6), minor roots, moderately plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	10 14 10 12				40.5 39.1 38.5				4.0 - 4.4 ft: Silty, Sandy CLAY, (CL); Light olive gray (5Y6/1), firm, moist, sharp contact with layer below.	Hole advanced to depth by 3" OD split spoon samplers.
											4.4 - 4.7 ft: Organic, Clayey SILT, (OL); Black (N1), loose, soft, slightly moist, sharp contact with layer below.	
											4.7 - 4.9 ft: CLAY, (CL); Greenish gray (5GY6/1), plastic, moderately soft, moist.	
											4.9 - 7.4 ft: SAND, (SP); Light olive gray (5Y6/1) changing to Grayish red (10R4/2) at 6.0', very fine grained, well sorted, firm, moist, wet below 6.0'.	Borehole enlarged by driving 3.5" OD split spoon to depth.
TOTAL DEPTH = 8.0 FT.											3" PVC casing inserted to 7.0' for gamma-logging.	
											PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R545
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GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R546**

SITE: **Sears; 200 St. Rt. 17** COORDINATES: **N 8052.0; E 10749.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **11-5-90** COMPLETED: **11-5-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Tripod** SIZE: **3.5"** OVERBURDEN: **6.0** ROCK (FT.): **0.0** TOTAL DEPTH: **6.0**

CORE RECOVERY (FT./%) **3.7/62*** CORE BOXES: **0** SAMPLES: **3** EL. TOP CASING: **NA** GROUND EL.: **46.0** DEPTH/EL. GROUND WATER: **NA / NA** DEPTH/EL. TOP OF ROCK: **NA / NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.2	30				46.0			0.0 - 0.2 ft: ASPHALT. 0.2 - 2.7 ft: FILL; Black (N1) to Grayish black (N2) between 0.2 - 1.2' and yellowish gray (5Y7/2) to Moderate brown (5YR3/4) between 2.0 - 2.7', mixed clay, silt and sand, brick fragments, shells and debris. 2.7 - 3.1 ft: Clayey SILT, (ML); Black (N1) slightly plastic, moist. 3.1 - 3.5 ft: Clayey SAND, (SC); Greenish gray (5GY6/1), sand is fine grained, moderately sorted, firm, moist. 4.0 - 4.6 ft: Clayey SAND to SAND, (SC); Light olive gray (5Y5/2) to Greenish gray (5GY6/1), interlayered clays, silts and sands; sand is fine to medium grained, moderately well sorted; clayey layers are slightly plastic; firm, moist. 4.6 - 5.0 ft: SAND and SILT, (SP & ML); Grayish red (10R4/2), very fine grained, well sorted, firm, moist. TOTAL DEPTH = 6.0 FT.	Complete borehole number is B3890R546. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 4.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
			17				45.8				
			14				44.8				
			21				44.0				
SS	2.0	1.5	21				44.0				
			17				43.3				
			14				42.9				
			19				42.5				
SS	2.0	1.0	13				42.0				
			17				42.0				
			21				41.4				
			22				41.0				
							40.0				

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **Sears; 200 St. Rt. 17** Last Update: **03-19-92**

HOLE NO. **R546**



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R547
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Sears; 200 St. Rt. 17			N 8050.0; E 10900.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-6-90	11-6-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
6.1/76*		0	4	NA	45.5	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Stephen Knuttel						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.						
SS	2.0	1.7	19 19 17 16			45.5 45.3 44.2 43.8 43.5				0.0 - 0.4 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R547. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.9	22 24 26 26			42.5			1.3 - 3.0 ft: Silty SAND, (SM); Dark reddish brown (10R3/4) changing to Dusky brown (5YR2/2) with layers of Black (N1) at 2.7', very fine grained, moderately well sorted; minor gravel and sedimentary clasts between 1.3 - 2.7'; firm, moist.		
SS	2.0	1.2	22 26 42 44			41.7 41.6 41.5 41.4 40.5 40.3	5		3.0 - 3.8 ft: SAND, (SW); Grayish brown (5YR3/2), fine to medium grained, moderately sorted, minor subrounded pebbles up to 1 cm, firm, moist.		
SS	2.0	1.3	30 23 34 35			39.5 39.3			3.8 - 4.1 ft: Clayey SILT, (ML); Black (N1), some pebbles, firm, moist.		
						38.2			4.1 - 5.0 ft: Clayey SAND, (SC); Light olive gray (5Y5/2) to Grayish red (5Y4/2), sand is fine grained, moderately sorted, plasticity increases with clay content, firm, moist.		
						37.5			5.0 - 6.2 ft: Gravelly SAND to Silty GRAVEL, (SW-GM); Grayish red (10R4/2), angular gravel with sand, silt and clay, firm, moist.		
									6.2 - 7.3 ft: Clayey SAND, (SC); Moderate brown (5YR3/4), sand is fine grained, minor gravel, moderately sorted, firm, moist.		
									TOTAL DEPTH = 8.0 FT.		

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R547
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R548
SITE Sears; 200 St. Rt. 17			COORDINATES N 8075.0; E 10925.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 11-6-90	COMPLETED 11-6-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 10.0	ROCK (FT.) 0.0	TOTAL DEPTH 10.0	
CORE RECOVERY (FT./%) 6.2/62*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 45.5	DEPTH/EL. GROUND WATER NA / -7' ATD		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.3	20 19 14 12				45.5 45.2 44.2			<p>0.0 - 0.3 ft: ASPHALT; over sand and gravel.</p> <p>0.3 - 1.3 ft: Silty SAND (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, minor sandstone gravel, firm, slightly moist.</p> <p>2.0 - 2.2 ft: SAND (SW); Moderate brown (5YR4/4), fine grained, moderately sorted, firm, slightly moist.</p> <p>2.2 - 2.4 ft: Sandy SILT (ML); Grayish black (N2), minor pebbles, moderately firm, slightly moist.</p> <p>2.4 - 8.7 ft: Gravelly, Silty SAND (SM); Dark reddish brown (10R3/4), sand is fine to coarse, poorly sorted, Sandy Silt in places, firm, moist to wet below 6.0'; sedimentary clasts composed of Clayey Silt, Light olive gray (5Y5/2), between 4.7 - 4.9'.</p>	<p>Complete borehole number is B3890R548.</p> <p>Sampled through asphalt with split spoon.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p>
SS	2.0	1.6	21 27 31 33				43.5 43.3 43.1				
SS	2.0	1.4	18 30 31 27				41.9 41.5				
SS	2.0	1.2	21 32 27 29				40.1 39.5	5			
SS	2.0	0.7	20 18 14 20				38.3 37.5 36.8				
							35.5	10		<p>TOTAL DEPTH = 10.0 FT.</p>	<p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted to 8.0' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with drilling spoils.</p>

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Sears; 200 St. Rt. 17

Last Update:
03-19-92

HOLE NO.
R548



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R549**

SITE: **Sears; 200 St. Rt. 17** COORDINATES: **N 8065.0; E 10915.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **11-6-90** COMPLETED: **11-6-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Tripod** SIZE: **3.5"** OVERBURDEN: **8.0** ROCK (FT.): **0.0** TOTAL DEPTH: **8.0**

CORE RECOVERY (FT./%) **6.0/75*** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **45.5** DEPTH/EL. GROUND WATER: **NA / none ATD** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	18				45.5				<p>(Template: NYWD)</p> <p>0.0 - 0.2 ft: ASPHALT.</p> <p>0.2 - 1.2 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), gravel is sandstone, sand is fine to medium grained, moderately sorted, firm, slightly moist.</p> <p>1.2 - 2.7 ft: SAND, (SW); Moderate brown (5YR4/4) changing to Grayish brown (5YR3/2) at 2.2', fine grained, moderately sorted, firm, slightly moist to moist.</p> <p>2.7 - 2.9 ft: Clayey SILT, (ML); Grayish black (N2), firm, moist.</p> <p>2.9 - 4.6 ft: Sandy SILT, (ML); Grayish black (N2), abundant coarse sand, minor roots, poorly sorted, moderately firm, slightly moist; mixed with lower layer below 4.0'.</p> <p>4.6 - 7.1 ft: Gravelly Sandy SILT, (ML); Dark reddish brown (10R3/4); gravel is of mixed composition, subrounded to subangular; sand is fine to coarse grained, poorly sorted, firm, moist.</p>	<p>Complete borehole number is B3890R549.</p> <p>Sampled through asphalt with split spoon.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p>
			11				44.3					
			18				44.1					
			22				43.5					
SS	2.0	1.6	20				42.8				<p>TOTAL DEPTH = 8.0 FT.</p>	<p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted to 6.0' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was grouted to -4' below surface and remaining hole backfilled with drilling spoils.</p>
			11				42.6					
			9				41.9					
			20				41.5					
SS	2.0	1.9	10				40.9					<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>
			22				39.6					
			31				39.5					
			20				38.4					
SS	2.0	1.1	21				37.5					
			20									
			35									
			40									

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

Sears; 200 St. Rt. 17

Last Update: 03-19-92

HOLE NO. R549



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
SITE										COORDINATES		14501	1 OF 1	R550
Sears; 200 St. Rt. 17										N 7950.0; E 10750.0		Vertical		-----
BEGUN	COMPLETED	DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-6-90	11-6-90	Hydro Group, Inc.			Tripod		3.5"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
5.4/68*		0	4	NA	46.5	V / none ATD / NA		NA/NA						
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			Stephen Knuttel								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.							
SS	2.0	1.4	10 20 20 19					46.5 46.2			0.0 - 0.3 ft: ASPHALT over sand and gravel.	Complete borehole number is B3890R550.		
								45.1		0.3 - 2.6 ft: Gravelly, Silty SAND; Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted, gravel is sandstone, firm, slightly moist.	Sampled through asphalt with split spoon.			
SS	2.0	1.3	14 9 4 5					44.5 43.9		2.6 - 3.3 ft: Organic, Clayey SILT, (OL); Black (N1), with matted root material, slightly plastic, soft, slightly moist.		Borehole sampled and gamma-logged by TMA/Eberline Corp.		
								43.2					Hole advanced to depth by 3" OD split spoon samplers.	
SS	2.0	1.4	10 10 14 27					42.5 41.6		4.0 - 4.9 ft: Clayey SAND, (SC); Greenish gray (5GY6/1), sand is fine grained, moderately well sorted, slightly plastic, firm, moist.				
								41.1	5	4.9 - 5.4 ft: SAND, (SW); Grayish red (5R4/2 - 10R4/2), fine grained, moderately sorted, minor clay and rounded pebbles, firm, moist.				
SS	2.0	1.3	15 20 24 27					40.5 39.6 39.2		6.0 - 6.9 ft: Silty SAND, (SM); Moderate brown (5YR3/4), sand is very fine grained, well sorted, firm, moist, gradual contact.	Borehole enlarged by driving 3.5" OD split spoon to depth.			
								38.5		6.9 - 7.3 ft: SAND, (SP); Dark yellowish brown (10YR4/2), very fine grained, well sorted, firm, wet.				
											TOTAL DEPTH = 8.0 FT.	3" PVC casing inserted to 6.0' for gamma-logging.		
												PVC casing was removed after logging and hole was backfilled with drilling spoils.		
												* Core recovery refers to total soil & rock sample.		
												Ground elevation estimated from site topographic map.		
												Description & classification by visual examination of sample.		
												Colors from "Rock-Color Chart" (GSA, 1948).		
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Sears; 200 St. Rt. 17			Last Update: 03-19-92		HOLE NO. R550			



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R551
SITE Sears; 200 St. Rt. 17		COORDINATES N 8050.0; E 10650.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 11-6-90	COMPLETED 11-6-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 8.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 5.3/66*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 46.5	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
SS	2.0	1.5	20 16 16 24				46.5 46.3 45.0 44.5			0.0 - 0.3 ft: ASPHALT; over sand and gravel. 0.3 - 2.6 ft: Gravelly, Silty SAND; Dusky brown (5YR3/2), sand is fine to medium grained, poorly sorted, gravel is sandstone, minor wood and debris, firm, moist.	Complete borehole number is B3890R551.
SS	2.0	1.1	15 9 7 4				43.9 43.4			2.6 - 3.1 ft: Organic, Clayey SILT, (OL); Black (N1), with matted root material, slightly plastic, soft, moist.	Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	6 6 6 6				42.5 42.1			4.4 - 5.1 ft: Clayey SAND, (SC); Greenish gray (5GY6/1), sand is fine grained, moderately sorted, slightly plastic, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.4	7 20 21 22				41.4 41.2 40.5 39.1 38.5			5.1 - 7.4 ft: SAND, (SP); Grayish red (10R4/2), very fine grained, moderately well sorted, minor silt below 6.0', firm, moist.	
TOTAL DEPTH = 8.0 FT.										Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R551
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.																																																																													
Sears; 200 St. Rt. 17				N 8150.0; E 10590.0		14501	1 OF 1	R552																																																																													
BEGUN		COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH																																																																												
11-6-90		11-6-90	Hydro Group, Inc.		Tripod	3.5"	8.0	0.0	8.0																																																																												
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK																																																																													
5.5/69*		0	4	NA	46.5	/ none ATD / NA		NA/NA																																																																													
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:																																																																															
140 lbs/30 in			none			Stephen Knuttel																																																																															
(Template: MYWD)																																																																																					
DESCRIPTION AND CLASSIFICATION																																																																																					
<table border="1"> <thead> <tr> <th rowspan="2">SAMP. TYPE AND DIAM.</th> <th rowspan="2">SAMP. ADV. LEN. CORE</th> <th rowspan="2">SAMPLE REC. CORE REC.</th> <th rowspan="2">SAMPLE BLINDS</th> <th rowspan="2">% CORE RECOVERY</th> <th rowspan="2">LOSS IN G.P.M.</th> <th colspan="2">WATER PRESSURE TESTS</th> <th rowspan="2">ELEV.</th> <th rowspan="2">DEPTH</th> <th rowspan="2">GRAPHICS</th> <th rowspan="2">SAMPLE</th> <th rowspan="2">NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.</th> </tr> <tr> <th>PRESS. P.S.F.</th> <th>TIME IN MIN.</th> </tr> </thead> <tr> <td>SS</td> <td>2.0</td> <td>1.3</td> <td></td> <td>22 11 13 19</td> <td></td> <td></td> <td></td> <td>46.5 46.2</td> <td></td> <td></td> <td></td> <td rowspan="13"> Complete borehole number is B3890R552. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948). </td> </tr> <tr> <td>SS</td> <td>2.0</td> <td>1.2</td> <td></td> <td>22 11 5 3</td> <td></td> <td></td> <td></td> <td>44.5 43.6 43.3</td> <td></td> <td></td> <td></td> </tr> <tr> <td>SS</td> <td>2.0</td> <td>1.6</td> <td></td> <td>5 9 11 26</td> <td></td> <td></td> <td></td> <td>42.5 41.9 41.3 40.9 40.5</td> <td></td> <td></td> <td></td> </tr> <tr> <td>SS</td> <td>2.0</td> <td>1.4</td> <td></td> <td>7 21 18 18</td> <td></td> <td></td> <td></td> <td>39.1 38.5</td> <td></td> <td></td> <td></td> </tr> <tr> <td colspan="12" style="text-align: center;">TOTAL DEPTH = 8.0 FT.</td> </tr> </table>										SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	PRESS. P.S.F.	TIME IN MIN.	SS	2.0	1.3		22 11 13 19				46.5 46.2				Complete borehole number is B3890R552. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	SS	2.0	1.2		22 11 5 3				44.5 43.6 43.3				SS	2.0	1.6		5 9 11 26				42.5 41.9 41.3 40.9 40.5				SS	2.0	1.4		7 21 18 18				39.1 38.5				TOTAL DEPTH = 8.0 FT.											
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH							GRAPHICS	SAMPLE						NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.																																																														
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SS	2.0	1.3		22 11 13 19				46.5 46.2				Complete borehole number is B3890R552. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).																																																																									
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SITE						Sears; 200 St. Rt. 17		Last Update: 03-19-92		HOLE NO. R552																																																																											



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R553
SITE Sears; 200 St. Rt. 17			COORDINATES N 8173.0; E 10905.0			ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 11-7-90	COMPLETED 11-7-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 10.0	ROCK (FT.) 0.0	TOTAL DEPTH 10.0
CORE RECOVERY (FT./%) 6.7/67*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 44.0	DEPTH/EL. GROUND WATER none ATD		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.4	7				44.0		(Template: MYWD)		
			7				43.3				
			7				42.6				
SS	2.0	1.1	9				42.0		0.0 - 0.7 ft: TOPSOIL; Grayish black (N2), silt and fine grained sand, minor roots, moderately sorted, loose, slightly moist. 0.7 - 2.3 ft: Gravelly, Silty SAND; Blackish red (5R2/2) to Moderate reddish brown (10R4/6), sand is fine to medium grained, poorly sorted, gravel is sandstone, firm, moist. 2.3 - 2.8 ft: Clayey SILT, (ML); Black (N1) to Grayish black (N2), minor root material; stringers of fine grained sand below 2.5'; slightly plastic, moderately firm, moist. 2.8 - 4.1 ft: SAND, (SW); Dark yellowish brown (10YR4/2), fine grained, moderately sorted, moderately firm, moist. 4.1 - 9.2 ft: SAND, (SP); Grayish red (5R4/2) gradually changing to Pale brown (5YR5/2) below 6.4', very fine to fine grained, well sorted, increasing silt content with depth, slightly layered, firm, moist, wet below 6.0'.	Complete borehole number is B3890R553. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.	
			9				41.7				
			9				41.2				
			18				40.9				
SS	2.0	1.3	14				40.0				
			15				39.9				
			18				38.7	5			
			18				38.0				
SS	2.0	1.7	10				38.0				
			12								
			13								
			11								
SS	2.0	1.2	8				36.3				
			9				36.0				
			15								
			21				34.8				
							34.0	10			
TOTAL DEPTH = 10.0 FT.										Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 8.0' for gamma-logging. PVC casing was removed after logging and hole was grouted to -2' below surface and remaining hole backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R553
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GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R554**

SITE **Sears; 200 St. Rt. 17** COORDINATES **N 8187.0; E 10871.0** ANGLE FROM HORIZ. BEARING **Vertical**

BEGUN **11-7-90** COMPLETED **11-7-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Tripod** SIZE **3.5"** OVERBURDEN **8.0** ROCK (FT.) **0.0** TOTAL DEPTH **8.0**

CORE RECOVERY (FT./%) **5.9/74*** CORE BOXES **0** SAMPLES **4** EL. TOP CASING **NA** GROUND EL. **44.0** DEPTH/EL. GROUND WATER **NA / none ATD** DEPTH/EL. TOP OF ROCK **NA/NA**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Stephen Knuttel**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	0.9	18 16 12 9				44.0			0.0 - 0.9 ft: Gravelly SAND; Dusky brown (5YR2/2), sand is fine to medium grained, poorly sorted, gravel is sandstone, minor debris, firm, slightly moist.	Complete borehole number is B3890R554.
SS	2.0	1.8	12 9 9 7				43.1 42.0 41.4			2.0 - 2.6 ft: SAND, (SW); Moderate brown (5YR3/4), minor Black (N1); fine grained, moderately sorted, moderately firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	12 16 16 11				40.5 40.2 40.0 39.5			2.6 - 3.5 ft: Sandy SILT and CLAY, (ML & CL); Grayish black (N2) to Black (N1), clay increases with depth; roots present below 3.0'; slightly plastic, firm, moist, sharp contact with unit below.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.6	12 19 15 12				38.4 38.0			3.5 - 4.5 ft: Clayey SAND, (SC); Greenish gray (5GY6/1) minor mottling with Moderate brown (5YR4/4); layer of coarse grained sand between 4.4 - 4.5'; sand is fine to medium grained, moderately sorted, slightly plastic, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
							36.4 36.0			4.5 - 5.6 ft: Sandy, Clayey SILT, (ML); Grayish red (5R4/2) mottled with Moderate brown (5YR4/4), firm, moist.	3" PVC casing inserted to 7.0' for gamma-logging.
										6.0 - 7.6 ft: SAND, (SP); Moderate brown (5YR3/4), very fine grained, moderately well sorted; minor silt between 6.0 - 6.4'; firm, wet.	PVC casing was removed after logging and hole was grouted to -4' below surface and remaining hole backfilled with drilling spoils.

TOTAL DEPTH = 8.0 FT.

* Core recovery refers to total soil & rock sample.
Ground elevation estimated from site topographic map.
Description & classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NO = CORE BARREL; SITE **Sears; 200 St. Rt. 17** Last Update: **03-19-92** HOLE NO. **R554**
HX = HAND AUGER; 0 = OTHER



GEOLOGIC DRILL LOG										PROJECT		JOB NO.		SHEET NO.		HOLE NO.			
SITE Sears; 200 St. Rt. 17										COORDINATES N 8215.0; E 10830.0				ANGLE FROM HORIZ Vertical				BEARING -----	
BEGUN 11-7-90		COMPLETED 11-7-90		DRILLER Hydro Group, Inc.			DRILL MAKE AND MODEL Tripod			SIZE 3.5"	OVERBURDEN 8.0		ROCK (FT.) 0.0		TOTAL DEPTH 8.0				
CORE RECOVERY (FT./%) 5.0/63*			CORE BOXES 0		SAMPLES 4		EL. TOP CASING NA		GROUND EL. 45.0		DEPTH/EL. GROUND WATER / none ATD / NA			DEPTH/EL. TOP OF ROCK NA/NA					
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in				CASING LEFT IN HOLE: DIA./LENGTH none				LOGGED BY: Stephen Knuttel											
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS LN. G.P.M.	WATER PRESSURE TESTS PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION			NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.						
SS	2.0	1.2	22 14 10 9				45.0 44.8			0.0 - 0.2 ft: ASPHALT.			Complete borehole number is B3890R555.						
SS	2.0	1.3	11 12 12 13				43.8 43.0 42.5			0.2 - 2.5 ft: Gravelly SAND, (SW); Dusky brown (5YR2/2), sand is fine to medium grained, poorly sorted, firm, slightly moist; sedimentary clasts composed of Clayey Silt, Black (N1), below 2.0'.			Sampled through asphalt with split spoon.						
SS	2.0	1.3	11 19 15 12				41.7 41.0 40.6			2.5 - 4.4 ft: Clayey SAND, (SC); Grayish green (10GY5/2), sand is fine to medium grained, moderately sorted, slightly plastic, firm, moist.			Borehole sampled and gamma-logged by TMA/Eberline Corp.						
SS	2.0	1.2	8 16 19 17				39.7 39.0	5		4.4 - 5.3 ft: Silty SAND, (SM); Grayish red (10R4/2); minor clayey sedimentary clasts present; sand is fine grained, moderately sorted, firm, moist.			Hole advanced to depth by 3" OD split spoon samplers.						
SS	2.0	1.2					37.8 37.0			6.0 - 7.2 ft: SAND, (SP); Moderate brown (5YR3/4) to Moderate yellowish brown (10YR5/4), very fine to fine grained, slightly layered, moderately well sorted within the layers, firm, moist to wet.									
										TOTAL DEPTH = 8.0 FT.			Borehole enlarged by driving 3.5" OD split spoon to depth.						
													3" PVC casing inserted to 5.5' for gamma-logging.						
													PVC casing was removed after logging and hole was grouted to -2' below surface and remaining hole backfilled with drilling spoils.						
													* Core recovery refers to total soil & rock sample.						
													Ground elevation estimated from site topographic map.						
													Description & classification by visual examination of sample.						
													Colors from "Rock-Color Chart" (GSA, 1948).						

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Sears; 200 St. Rt. 17

Last Update:
03-19-92

HOLE NO.
R555



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		ANGLE FROM HORIZ	BEARING					
Sears; 200 St. Rt. 17				N 8175.0; E 10848.0		Vertical	-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-7-90	11-7-90	Hydro Group, Inc.		Tripod		3.5"	8.0	0.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.5/81*		0	4	NA	44.0	-7' ATD NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.6	40 20 16 9				44.0 43.8				0.0 - 0.2 ft: ASPHALT.	<p>Complete borehole number is B3890R556.</p> <p>Sampled through asphalt with split spoon.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted to 4.3' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was grouted to -2' below surface and remaining hole backfilled with drilling spoils.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>
							42.7 42.4 42.0				0.2 - 1.3 ft: Gravelly SAND; Grayish brown (5YR3/2), sand is fine to medium grained, poorly sorted, firm, moist.	
SS	2.0	1.7	15 20 21 25				41.4 41.0				1.3 - 2.6 ft: Sandy SILT and CLAY (ML & CL); Black (N1), clay increases with depth, sand is fine to medium; roots present below between 2.0 - 2.3'; mixed with sediment below between 2.3 - 2.6'; slightly plastic, firm, moist, sharp contact with layer below.	
SS	2.0	1.5	19 16 16 16				40.3 40.0				2.6 - 3.0 ft: Clayey SAND, (SC); Grayish green (10GY5/2), sand is fine grained, moderately sorted; minor layers of well sorted clean sand; slightly plastic, firm, moist.	
SS	2.0	1.7	12 17 20 32				38.5 38.0	5			3.0 - 3.7 ft: SAND, (SP); Grayish red (5R4/2), very fine to fine grained, well sorted, firm, moist.	
							36.3 36.0				4.0 - 7.7 ft: Interlayered SAND and SILT, (SP & ML); Moderate brown (5YR3/4) to Moderate reddish brown (10R4/6), very fine to fine grained, moderately well sorted within the layers, firm, moist, wet below 6.0'.	
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
Sears; 200 St. Rt. 17

Last Update:
03-19-92

HOLE NO.
R556



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
SITE Sears; 200 St. Rt. 17										COORDINATES N 8175.0; E 10830.0		14501	1 OF 1	R557		
BEGUN 11-7-90		COMPLETED 11-7-90		DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0	TOTAL DEPTH 6.0	ANGLE FROM HORIZ Vertical		BEARING -----		
CORE RECOVERY (FT./%) 2.3/38*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 44.0	DEPTH/EL. GROUND WATER / none ATD / NA		DEPTH/EL. TOP OF ROCK NA/NA								
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel												
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE IN P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD) DESCRIPTION AND CLASSIFICATION				NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	0.6	40 22 14 11				44.0 43.8 43.4				0.0 - 0.2 ft: ASPHALT. 0.2 - 0.4 ft: SAND; Moderate brown (5YR3/2), fine grained. 0.4 - 2.4 ft: Clayey SAND, (CL); Black (N1), sand is fine grained, poorly sorted, minor gravel, moist.				Complete borehole number is BS890R557.	
SS	2.0	0.4	25 28 30 25				42.0 41.6				4.0 - 4.6 ft: SILT, (ML); Grayish red (5R4/2), firm, moist, gradational contact with layer below.				Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.3	10 16 20 25				40.0 39.4 38.7 38.0	5			4.6 - 5.3 ft: SAND, (SP); Grayish red (5R4/2), fine grained, well sorted, firm, moist to wet.				Hole advanced to depth by 3" OD split spoon samplers.	
											TOTAL DEPTH = 6.0 FT.				Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
															* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

Sears; 200 St. Rt. 17

Last Update: 03-19-92

HOLE NO. R557



GEOLOGIC DRILL LOG			PROJECT			JOB NO.	SHEET NO.	HOLE NO.				
SITE Sears; 200 St. Rt. 17			COORDINATES N 8135.0; E 10870.0			14501	1 OF 1	R558				
BEGUN 11-7-90	COMPLETED 11-7-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 8.0	ROCK (FT.) 0.0	TOTAL DEPTH 8.0			
CORE RECOVERY (FT./%) 5.1/64*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 43.5	DEPTH/EL. GROUND WATER -1' ATD / NA		DEPTH/EL. TOP OF ROCK NA/NA				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
											DESCRIPTION AND CLASSIFICATION	
SS	2.0	0.6	40					43.5			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R558.
			27					42.8			0.2 - 0.6 ft: FILL; mixed gravel, sand and clay.	
SS	2.0	1.4	27					41.5			2.0 - 3.0 ft: Clayey SAND, (SC); Greenish gray (5GY6/1) mottled with Grayish red (5Y4/2), sand is fine to medium grained, moderately sorted, slightly layered, firm, moist.	Sampled through asphalt with split spoon.
			25					40.5				Borehole sampled and gamma-logged by TMA/Eberline Corp.
			24					40.4				
			22					40.1				Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.3	15					39.5			3.0 - 7.8 ft: SAND, (SP); Grayish red (10R4/2) changing to Moderate brown (5YR4/4) at 3.1' and to Moderate brown (5YR3/4) at 6.0'; layer of medium grained sand, moderately sorted, loose, between 3.0 - 3.1'; very fine grained between 3.1 - 5.3'; fine grained between 6.0 - 7.8'; well sorted, clean, firm, moist, wet below 6.0'.	
			18					38.2	5			TOTAL DEPTH = 8.0 FT.
			22					37.5				
			18									Borehole enlarged by driving 3.5" OD split spoon to depth.
SS	2.0	1.8	7					35.7				
			12					35.5				3" PVC casing inserted to 4.0' for gamma-logging.
			23									PVC casing was removed after logging and hole was backfilled with drilling spoils.
			26									
SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; O = OTHER												* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SITE Sears; 200 St. Rt. 17						Last Update: 03-19-92		HOLE NO. R558				



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R559

SITE

Sears; 200 St. Rt. 17

COORDINATES

N 8125.0; E 10900.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-8-90

COMPLETED

11-8-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

8.0

ROCK (FT.)

0.0

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

6.6/83%

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

43.5

DEPTH/EL. GROUND WATER

7 / none ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	37 8 12				43.5				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R559.
							43.3				0.2 - 2.4 ft: Clayey, Sandy SILT, (ML); Black (N1); gravelly between 0.2 - 0.7'; increased sand below 2.0'; wood fragments present, firm, moist.	
SS	2.0	1.7	30 22 24 23				41.5				2.4 - 3.7 ft: SAND, (SW); Grayish brown (5YR3/2), fine grained, poorly sorted, minor silt and clay, small sedimentary clasts present; changing to Moderate brown (5YR3/4), very fine grained, moderately sorted, at 2.9'; firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	14 20 19 19				39.8 39.5				4.0 - 5.4 ft: SAND, (SP); Brownish black (5YR2/1) changing to Moderate brown (5YR3/4) at 4.8', fine grained, moderately well sorted, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.8	17 21 25 23				38.1 37.7 37.5	5			5.4 - 5.8 ft: Gravelly, Sandy SILT, (ML); Grayish red (5R4/2); gravel is mixed composition, rounded; very poorly sorted, firm, moist.	
							36.2 35.7 35.5				6.0 - 7.3 ft: SAND, (SW); Dark reddish brown (10R3/4), medium grained, moderately sorted, little fines, loose, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
											7.3 - 7.8 ft: Gravelly, Sandy SILT, (ML); Dark reddish brown (10R3/4); gravel is sandstone, subrounded to subangular; poorly sorted, firm, moist.	3" PVC casing inserted to 6.5' for gamma-logging.
TOTAL DEPTH = 8.0 FT.											PVC casing was removed after logging and hole was grouted to -3' below surface and remaining hole backfilled with drilling spoils.	

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER

SITE

Sears; 200 St. Rt. 17

Last Update: 03-19-92

HOLE NO. R559



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		ANGLE FROM HORIZ		BEARING				
Sears; 200 St. Rt. 17				N 8125.0; E 10890.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-8-90	11-8-90	Hydro Group, Inc.		Tripod		3.5"	6.9	0.0	6.9			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
5.0/72*		0	4	NA	43.5	/ none ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BL. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.2	40 30 31 30				43.5 42.8 42.3 41.5 40.8			0.0 - 0.6 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R560.	
SS	2.0	1.6	38 35 32 32				39.9 39.5			0.6 - 2.7 ft: SAND, (SW); Pale brown (5YR5/2) to Grayish brown (5YR3/2), fine grained, poorly sorted, minor sandstone gravel and small sedimentary clasts present, firm, moist.	Sampled through asphalt with split spoon.	
SS	2.0	1.9	12 14 31 25				38.0 37.8 37.6 37.5 37.2	5		2.7 - 5.5 ft: SAND, (SW); Light brown (5YR5/6); with layers of Silty Sand below 4.0'; fine grained, poorly sorted, minor silt, clay, and gravel; gravel is mixed composition, subrounded to subangular; firm, moist to wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.	
SS	0.9	0.3	25 50/5"				36.6			5.5 - 5.7 ft: SAND, (SP); Dark reddish brown (10R3/4), medium grained, moderately well sorted, little fines, loose, moist.	Spoon refusal at 6.9'. Borehole enlarged by driving 3.5" OD split spoon to depth.	
										5.7 - 6.3 ft: Gravelly, Sandy SILT, (ML); Dark reddish brown (10R3/4), with fine to medium sand and subrounded to subangular sandstone gravel, firm, moist.	3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
TOTAL DEPTH = 6.9 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Sears; 200 St. Rt. 17

Last Update:
03-19-92

HOLE NO.
R560



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			COORDINATES	14501	1 OF 1	R561
Sears; 200 St. Rt. 17			N 8100.0; E 10890.0	ANGLE FROM HORIZ		BEARING
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
11-8-90	11-8-90	Hydro Group, Inc.	Tripod	3.5"	8.0	0.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
4.2/53*	0	4	NA	44.0	↓ / none ATD ↓ / NA	NA/NA
SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:			
140 lbs/30 in	none		Stephen Knuttel			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	26 22 13 10				44.0 43.8 43.5 43.0 42.7 42.6 42.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R561.
SS	2.0	1.4	15 23 34 4				42.0 41.2 40.6 40.0				0.5 - 1.0 ft: SAND, (SW); Pale brown (5YR5/2), fine grained, moderately sorted, firm, moist.		Sampled through asphalt with split spoon.
SS	2.0	0.9	20 30 40 35				39.1	5			1.0 - 1.4 ft: Silty SAND and Clayey SILT, (SM & ML); Silty Sand, Black (N1), sand is fine grained, moderately sorted; changing to Clayey Silt, Grayish black (N2), slightly plastic, with wood fragments, at 1.3'; firm, moist, sharp contact with layer below.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.5	30 28 22 16				38.0 37.5 36.0				2.0 - 2.8 ft: Clayey SAND, (SC); Greenish gray (5GY6/1), sand is very fine grained, moderately sorted, interlayered with silt, slightly plastic, firm, moist.		Hole advanced to depth by 3" OD split spoon samplers.
											2.8 - 3.4 ft: Silty SAND, (SM); Grayish red (5R4/2) changing to Moderate reddish brown (10R3/4) at 3.0', sand is fine grained, poorly sorted, minor subrounded gravel, poorly sorted, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
											4.0 - 6.5 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted, Sandy Silt in places; gravel is primarily sandstone, subangular to angular; firm, moist.		3" PVC casing inserted to 5.0' for gamma-logging.
											TOTAL DEPTH = 8.0 FT.	PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R561
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R562
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Sears; 200 St. Rt. 17			N 8100.0; E 10910.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-8-90	11-8-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.2/53*		0	4	NA	44.0	V / none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLINDS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.5	21 14 14 20				44.0					0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R562.
							43.8 43.5 42.5					0.2 - 0.5 ft: SAND, (SW); Moderate reddish brown (10R4/6), fine grained.	
SS	2.0	1.5	21 25 24 27				42.0					0.5 - 1.5 ft: Silty SAND and Clayey SILT, (SM & ML); Grayish black (N2) changing to Olive gray (5Y5/2) at 0.7', clay decreases with depth, sand is fine to medium grained, poorly sorted, slightly plastic, firm, moist.	Sampled through asphalt with split spoon.
							41.2					2.0 - 2.8 ft: Clayey SAND, (SC); Light olive gray (5Y5/2) mottled with Grayish red (5R4/2), sand is fine to medium grained, moderately sorted, slightly plastic, firm, moist.	
SS	2.0	0.7	25 27 34 27				40.5 40.0					2.8 - 6.5 ft: Gravelly SILT to Sandy GRAVEL, (ML-GM); Grayish red (5R4/2), gravel is mixed composition up to 0.2', subrounded to angular, poorly sorted, firm to dense, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
							39.3						
SS	2.0	0.5	27 27 24 30				38.0 37.5						Hole advanced to depth by 3" OD split spoon samplers.
							36.0						
TOTAL DEPTH = 8.0 FT.												Borehole enlarged by driving 3.5" OD split spoon to depth.	
												3" PVC casing inserted to 5.5' for gamma-logging.	
												PVC casing was removed after logging and hole was backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update:	03-19-92	HOLE NO.	R562
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R563
SITE			COORDINATES			ANGLE FROM HORIZ BEARING				
Sears; 200 St. Rt. 17			N 8125.0; E 10910.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-8-90	11-8-90	Hydro Group, Inc.	Tripod	3.5"	6.0	0.0	6.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.7/62*		0	3	NA	43.5	V / none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.1	10				43.5						
			23				43.1						
			16				42.4						
			16										
SS	2.0	1.4	25				41.5						
			23				41.1						
			20				40.4						
			16				40.1						
SS	2.0	1.2	9				39.5						
			13				38.3	5					
			14				37.5						
			16										
(Template: MYWD) 0.0 - 0.4 ft: ASPHALT; over sand and gravel. 0.4 - 2.4 ft: SAND, (SW); Moderate brown (5YR4/4), fine to medium grained, poorly sorted, dirty, firm, moist. 2.4 - 3.1 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted; gravel is sandstone, subrounded to subangular; firm, moist to wet. 3.1 - 3.4 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained, moderately sorted, firm, moist. 4.0 - 5.2 ft: SAND, (SP); Moderate brown (5YR4/4), very fine to fine grained, well sorted, firm, moist to wet. TOTAL DEPTH = 6.0 FT.												Complete borehole number is B3890R563. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 4.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; HQ = CORE BARREL; SITE Sears; 200 St. Rt. 17 Last Update: 03-19-92 HOLE NO. R563
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R564
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Sears; 200 St. Rt. 17			N 8075.0; E 10900.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-8-90	11-8-90	Hydro Group, Inc.	Tripod	3.5"	8.0	0.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.9/61*		0	4	NA	45.0	/ none ATD		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.6	20				45.0						
			9				44.8					0.0 - 0.4 ft: ASPHALT: over sand and gravel.	Complete borehole number is B3890R564.
			17									0.4 - 1.6 ft: SAND, (SW); Moderate brown (5YR3/4), fine to medium grained, moderately sorted, firm, moist.	
			18				43.4						Sampled through asphalt with split spoon.
SS	2.0	0.8	25				43.0					2.0 - 4.3 ft: Clayey SAND, (SC); Grayish red (5Y4/2), sand is fine grained, moderately sorted, slightly plastic, very firm, moist.	
			27				42.2						Borehole sampled and gamma-logged by TMA/Eberline Corp.
			32										
			35				41.0						Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.4	35				40.7					4.3 - 4.9 ft: Gravelly, Silty SAND, (SM); Dusky red (5R3/4), sand is fine to medium grained, poorly sorted, Sandy Silt in places, gravel is sandstone, firm, moist.	
			27				40.1						Borehole enlarged by driving 3.5" OD split spoon to depth.
			19				39.6						
			20				39.0						3" PVC casing inserted to 6.0' for gamma-logging.
SS	2.0	1.1	20				38.6					4.9 - 5.4 ft: Clayey SAND, (SC); Grayish red (5Y4/2), sand is fine grained, moderately sorted, slightly plastic, very firm, moist.	
			25				37.9						PVC casing was removed after logging and hole was backfilled with drilling spoils.
			23				37.0					6.4 - 7.1 ft: Silty, Gravelly SAND, (SW); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted, gravel is sandstone, firm, moist to wet.	
			27										
TOTAL DEPTH = 8.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Sears; 200 St. Rt. 17

Last Update: 03-19-92

HOLE NO. R564



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R565
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Sears; 200 St. Rt. 17			N 8065.0; E 10925.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-9-90	11-9-90	Hydro Group, Inc.		Tripod	3.5"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
4.3/54*		0	4	NA	45.5	NA / none ATD	NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.0	25 19 12 20				45.5 46.3 44.5			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R565. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS	2.0	1.3	19 18 19 30				43.5 43.2 43.0 42.2			2.0 - 2.5 ft: Clayey SILT to Silty CLAY, (ML & CL); Clayey Silt, Black (N1), some sand, roots and wood fragments, low plasticity; changing to Silty Clay, Grayish black (N2), moderate plasticity, at 2.3' firm, moist.		
SS	2.0	0.8	40 32 36 35				41.5 40.7	5		2.5 - 3.3 ft: Clayey SAND, (SC); Light olive gray (5Y5/2) mottled with Grayish red (5R4/2), sand is very fine, moderately well sorted, slightly plastic, firm, moist.		
SS	2.0	1.2	35 42 40 37				39.5 38.3 37.5			4.0 - 7.2 ft: Gravelly, Sandy SILT to Silty SAND, (ML-SM); Grayish red (5R4/2) changing to Dark reddish brown (10R3/4) at 6.0', sand is fine grained, poorly sorted; gravel is of mixed composition, sandstone gravel increasing with depth; minor clay decreasing with depth; firm, moist.		
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update:	03-19-92	HOLE NO.	R565
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R566
SITE Sears; 200 St. Rt. 17			COORDINATES N 8050.0; E 10910.0			ANGLE FROM HORIZON Vertical		
BEGUN 11-9-90	COMPLETED 11-9-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod		SIZE 3.5"	OVERBURDEN 5.3	ROCK (FT.) 0.0	TOTAL DEPTH 5.3
CORE RECOVERY (FT./%) 3.4/64*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 45.5	DEPTH/EL. GROUND WATER NA / none ATD		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	2.0	1.3	14 12 12 10				45.5 45.3 44.7 44.2		0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R566.	
SS	2.0	1.0	15 16 16 15				43.5 43.3 42.5		0.2 - 0.8 ft: SAND, (SW); Moderate reddish brown (10R4/6), fine to medium grained, moderately sorted, firm, moist.	Sampled through asphalt with split spoon.	
SS	1.3	1.1	35 50 50/4"				41.5 41.1 40.8 40.4 40.2	5	0.8 - 1.3 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, gravel is sandstone, firm, moist. 2.0 - 2.2 ft: Clayey SILT, (ML); Black (N1), slightly plastic, firm, slightly moist. 2.2 - 4.4 ft: SAND, (SW); Grayish brown (5YR3/2), fine to medium grained, poorly sorted, minor subrounded pebbles up to 1 cm, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.	
									4.4 - 4.7 ft: Sandy GRAVEL, (GS); Brownish black (5YR2/1), angular gravel of mixed composition, minor silt and clay, dense, slightly moist. 4.7 - 5.1 ft: Silty SAND to Sandy SILT, (SM-ML); Grayish red (10Y4/2) to Moderate reddish brown (10R3/4), some gravel, firm, slightly moist.	Spoon refusal at 5.3'. Borehole enlarged by driving 3.5" OD split spoon to depth.	
TOTAL DEPTH = 5.3 FT.										3" PVC casing inserted to 4.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE Sears; 200 St. Rt. 17 Last Update: 03-19-92 HOLE NO. R566
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP**
 JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R567**

SITE: **Sears; 200 St. Rt. 17**
 COORDINATES: **N 8250.0; E 10793.0**
 ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **11-12-90** COMPLETED: **11-12-90** DRILLER: **Hydro Group, Inc.**
 DRILL MAKE AND MODEL: **Tripod** SIZE: **6"** OVERBURDEN: **8.0** ROCK (FT.): **0.0** TOTAL DEPTH: **8.0**

CORE RECOVERY (FT./%): **4.1/51*** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **45.5** DEPTH/EL. GROUND WATER: **NA / NA** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					TESTS	P.S.F.						
SS	2.0	0.9	23 11 00 6				45.5 45.3 45.1 44.6				0.0 - 0.4 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R567. Sampled through asphalt with split spoon. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.1	6 4 4 6				43.5 42.4				0.4 - 3.1 ft: SAND, (SP); Moderate brown (5YR4/4), fine to medium grained, moderately well sorted, loose, slightly moist.	
SS	2.0	1.0	5 4 10 16				41.5 41.1 40.8 40.5	5			4.0 - 6.3 ft: Sandy CLAY, (CL); Greenish gray (5GY6/1), plasticity and clay content decrease with depth, moderately firm, moist; layer of Clayey Sand, fine grained, moderately sorted, between 4.4 - 4.7'.	
SS	2.0	1.1	8 14 16 25				39.5 39.2 38.4				6.3 - 7.1 ft: Clayey SAND, (SC); Light olive gray (5Y5/2) changing to Dark yellowish orange (10YR6/6) at 6.8', sand is very fine grained, moderately well sorted, moderately plastic, firm, moist.	
							37.5				TOTAL DEPTH = 8.0 FT.	Borehole diameter enlarged by driving 6" steel casing to depth. 3" PVC casing inserted to total depth for gamma-logging. Steel casing removed from hole with PVC casing remaining in hole. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE: **Sears; 200 St. Rt. 17** Last Update: **03-19-92** HOLE NO.: **R567**



GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: R568

SITE: Sears; 200 St. Rt. 17
 COORDINATES: N 8290.0; E 10738.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 11-12-90
 COMPLETED: 11-12-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Tripod
 SIZE: 6"
 OVERBURDEN: 8.0
 ROCK (FT.): 0.0
 TOTAL DEPTH: 8.0

CORE RECOVERY (FT./%): 5.0/63*
 CORE BOXES: 0
 SAMPLES: 4
 EL. TOP CASING: NA
 GROUND EL.: 46.0
 DEPTH/EL. GROUND WATER: none ATD / NA
 DEPTH/EL. TOP OF ROCK: NA/NA

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOCKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.3	6					46.0					(Template: MYWD) Complete borehole number is B3890R568. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole diameter enlarged by driving 6" steel casing to depth. 3" PVC casing inserted to 7.8' for gamma-logging. Steel casing removed from hole with PVC casing remaining in hole. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			10					45.5			0.0 - 0.5 ft: TOPSOIL; Silty SAND, Grayish black (N2).		
			11					44.7			0.5 - 3.0 ft: SAND, (SW); Grayish red (10R4/2) to Moderate brown (5YR4/4), fine to medium grained, moderately sorted; minor gravel between 2.0 - 3.0'; firm, moist.		
SS	2.0	1.3	9					44.0			3.0 - 3.1 ft: Silty CLAY, (CL); Black (N1), slightly plastic, firm, moist.		
			14					43.0			3.1 - 4.6 ft: Sandy, Silty CLAY, (CL); Greenish gray (5GY6/1), moderately plastic, firm, moist.		
			17					42.9			4.6 - 5.2 ft: Clayey SAND, (SC); Pale yellowish brown (10YR6/2), sand is very fine grained, moderately well sorted, firm, moist.		
			23					42.0			6.0 - 7.2 ft: Clayey SILT, (ML); Pale reddish brown (10R5/4), slightly plastic, firm, moist; layer of Sand, Moderate reddish brown (10R4/6), medium grained, clean, moderately sorted, between 6.8 - 7.0'.		
SS	2.0	1.2	19					41.4	5				
			24					40.8					
			30					40.0					
SS	2.0	1.2	23					39.2					
			25					39.0					
			30					38.8					
			27					38.0					
TOTAL DEPTH = 8.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; SX = HAND AUGER; O = OTHER
 SITE: Sears; 200 St. Rt. 17
 Last Update: 03-19-92
 HOLE NO.: R568



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R569

SITE

Sears; 200 St. Rt. 17

COORDINATES

N 8330.0; E 10680.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

COMPLETED

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

8.0

ROCK (FT.)

0.0

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

5.7/71%

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

46.5

DEPTH/EL. GROUND WATER

NA / none ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.F.	TIME MIN.						
SS	2.0	1.8	10				46.5					
			11				46.0				0.0 - 0.4 ft: TOPSOIL; Silty Sand, Grayish black (N2), with sandstone gravel, Dark reddish brown (10R3/4).	Complete borehole number is B3890R569.
			9				44.7				0.4 - 2.4 ft: SAND, (SW); Moderate brown (5YR4/4), medium grained, moderately sorted, minor gravel, loose, slightly moist.	
SS	2.0	1.7	8				44.5				2.4 - 3.7 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, gravel is sandstone, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			8				44.1				4.0 - 4.2 ft: Silty CLAY, (CL); Black (N1) to Medium bluish gray (5B5/1), minor roots, plastic, soft, moist.	
SS	2.0	1.0	5				42.8				4.2 - 6.8 ft: Sandy SILT, (ML); Light olive gray (5Y6/1) changing to Pale yellowish brown (10YR6/2) at 6.0', sand is very fine grained, well sorted, firm, moist, wet below 6.0'.	Hole advanced to depth by 3" OD split spoon samplers.
			9				42.5				6.8 - 7.2 ft: Silty SAND, (SM); Moderate brown (5YR4/4), sand is fine grained, moderately sorted, minor clay, moderately firm, wet.	
			14				41.5	5				
			17				40.5					
SS	2.0	1.2	8				39.7					
			12				39.3					
			8				38.5					
TOTAL DEPTH = 8.0 FT.												Borehole enlarged by driving 3.5" OD split spoon to depth.
												3" PVC casing inserted to 7.8' for gamma-logging.
												PVC casing was removed after logging and hole was backfilled with drilling spoils.
												* Core recovery refers to total soil & rock sample.
												Ground elevation estimated from site topographic map.
												Description & classification by visual examination of sample.
												Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
 HX = HAND AUGER; O = OTHER

Sears; 200 St. Rt. 17

Last Update: 03-19-92

HOLE NO. R569



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			COORDINATES	14501	1 OF 1	C570
Sears; 200 St. Rt. 17			N 8123.0; E 10900.0	ANGLE FROM HORIZ		BEARING
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
11-13-90	11-13-90	Hydro Group, Inc.	Tripod	3.5"	7.2	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
3.8/53*		0	4	NA	43.5	DEPTH/EL. TOP OF ROCK
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.1	30 19 16 16				43.5					
SS	2.0	1.2	12 28 24 20				42.4				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R570.
SS	2.0	1.1	16 15 24 20				41.5				2.0 - 3.2 ft: SAND, (SW); Grayish brown (5YR3/2), fine to medium grained, poorly sorted, minor silt and clay, firm, moist.	Sampled through asphalt with split spoon.
SS	2.0	1.1	16 15 24 20				40.3				4.0 - 5.1 ft: SAND, (SP); Moderate brown (5YR4/4), very fine grained, well sorted, firm, wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.2	0.4	30 40 50/3"				39.5				6.0 - 6.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted, gravel is sandstone, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
							38.4	5			TOTAL DEPTH = 7.2 FT.	Spoon refusal at 7.2'.
							37.5					Borehole enlarged by driving 3.5" OD split spoon to depth.
							37.1					3" PVC casing inserted to 7.0' for gamma-logging.
							36.3					PVC casing was removed after logging and hole was grouted to -2' below surface and remaining hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Last Update:	HOLE NO.
	Sears; 200 St. Rt. 17	03-19-92	C570



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R571

SITE

Sears; 200 St. Rt. 17

COORDINATES

N 8205.0; E 10820.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

11-13-90

COMPLETED

11-13-90

Hydro Group, Inc.

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

6"

OVERBURDEN

8.0

ROCK (FT.)

0.0

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

4.9/61*

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

45.0

DEPTH/EL. GROUND WATER

7 / none ATD
NA / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

(Template: MYWD)

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	40				45.0				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R571.
			35									
SS	2.0	1.5	10				43.7				0.2 - 1.3 ft: SAND, (SW); Moderate brown (5YR3/4), fine to medium grained, poorly sorted; minor silt, clay and gravel; loose, slightly moist.	Sampled through asphalt with split spoon.
			14									
			18									
			20									
SS	2.0	0.9	20				43.0	5			2.0 - 2.1 ft: Silty CLAY, (CL); Black (N1), plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			20									
			25									
			26									
SS	2.0	1.2	14				41.5				2.1 - 4.3 ft: Clayey SAND, (SC); Grayish green (10GY5/2); layer of Sandy Clay between 2.1 - 2.2'; sand is fine to medium grained, some coarse grains, moderately sorted, plasticity increases with clay content, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
			18									
			26									
			30									
							40.1				4.3 - 6.4 ft: Silty SAND, (SM); Grayish red (10R4/2) sand is very fine grained, moderately well sorted, silt content increases with depth, firm, slightly moist.	Borehole diameter enlarged by driving 6" steel casing to depth.
			39.0									
			38.6									
							37.8				6.4 - 7.3 ft: SAND, (SP); Moderate brown (5YR4/4) to Light brown (5YR5/6), very fine grading to fine grained at 6.8'; moderately well sorted within the layers, silt content decreases with depth, clean at bottom, firm, moist.	3" PVC casing inserted to 7.5' for gamma-logging.
						37.0				TOTAL DEPTH = 8.0 FT.	Steel casing removed from hole with PVC casing remaining in hole.	
												PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER

SITE

Sears; 200 St. Rt. 17

Last Update: 03-19-92

HOLE NO. R571



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
			FUSRAP	14501	1 OF 1	R626
SITE		COORDINATES			ANGLE FROM HORIZ	BEARING
Sears; 200 St. Rt. 17		N 8262.0; E 10760.0			Vertical	-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
1-10-91	1-10-91	Hydro Group, Inc.	Soil Sentry	3.5"	8.0	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
3.8/48°		0	4	NA	45.5	↓ / none ATD ↓ / NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
							45.5			(Template: MYWD)	
SS	1.5	0.3	18 20 25				45.3 44.7			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R626.
SS	2.0	1.1	5 7 15 18				43.5 43.1 42.8 42.6 42.4			0.5 - 2.4 ft: SAND, (SW); Moderate brown (5YR5/4), fine to medium grained, moderately sorted, minor gravel, loose, slightly moist.	Augered through asphalt to 0.5'.
SS	2.0	1.3	9 12 18 30				41.5 41.2			2.4 - 2.7 ft: Clayey SILT, (ML); Black (N1), with fine roots, slightly plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	nr				40.2 39.5 38.4 37.5	5		2.7 - 2.9 ft: CLAY, (CL); Grayish green (10GY5/2), plastic, firm, moist.	Augered to 4.0'.
										2.9 - 4.3 ft: Clayey SAND, (SC); Grayish green (10GY5/2), sand is fine grained, moderately well sorted, firm, moist.	Augered to 6.0'.
										4.3 - 5.3 ft: SAND, (SW); Moderate reddish brown (10R4/6) changing to Pale yellowish brown (10Y6/2) at 4.4', fine to medium grained, moderately sorted; silty between 4.3 - 4.4', minor silt elsewhere; firm, moist.	
										6.0 - 7.1 ft: SILT, (ML); Pale reddish brown (10R5/4), very firm, moist.	
										TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

nr = not recorded.
 * Core recovery refers to total soil & rock sample.
 Ground elevation estimated from site topographic map.
 Description & classification by visual examination of sample.
 Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. R626
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GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R627
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING		
Sears; 200 St. Rt. 17			N 8226.0; E 10812.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-10-91	1-10-91	Hydro Group, Inc.		Soil Sentry		3.5"	4.8	0.0	4.8		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
2.4/50*		0	3	NA	45.5	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						P.S.F.	TIME MIN.						
								45.5					
SS	1.5	0.8	27					45.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R627. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 2.0'. Augered to 4.0'. Spoon refusal at 4.8'. Augered to 4.8'; hole stopped because of possible water line. Gamma-logging completed in open hole. Hole was backfilled with drilling spoils.
			20					44.2				0.5 - 3.6 ft: SAND, (SW); Moderate brown (6YR3/4), fine grained, moderately sorted, minor silt, firm, moist.	
SS	2.0	1.6	10					43.5					
			16					41.9					
SS	0.8	0.0	7					40.7					
			50/4"									TOTAL DEPTH = 4.8 FT.	

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Sears; 200 St. Rt. 17	Last Update:	03-19-92	HOLE NO.	R627
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. C628
SITE Sears; 200 St. Rt. 17			COORDINATES N 8227.0; E 10808.0			ANGLE FROM HORIZ. Vertical		BEARING -----
BEGUN 1-10-91	COMPLETED 1-10-91	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Soil Sentry	SIZE 3.5"	OVERBURDEN 8.0	ROCK (FT.) 0.0	TOTAL DEPTH 8.0
CORE RECOVERY (FT./%) 4.5/56*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 45.5	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
							45.5				(Template: MYWD)	
SS	1.5	0.9	18 24 22				45.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890C628.
SS	2.0	1.1	5 9 12 20				44.1				0.5 - 2.3 ft: SAND, (SW); Moderate brown (5YR4/4), fine to medium grained, moderately sorted, minor gravel, loose, slightly moist.	Augered through asphalt to 0.5'.
							43.5				2.3 - 3.0 ft: Organic, Clayey SILT, (OL); Brownish black (5YR2/1), with fine roots, slightly plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	nr				42.5				3.0 - 3.1 ft: CLAY, (CL); Greenish gray (5GY6/1) with staining of Olive black (5Y2/1), moderately plastic, firm, moist.	Augered to 2.0'.
							41.5				4.0 - 4.4 ft: Clayey SAND, (SC); Grayish green (10GY5/2) mottled with Light olive brown (5Y5/6), sand is fine grained, moderately sorted, firm, moist.	Augered to 4.0'.
SS	2.0	1.2	9 12 14 10				41.1				4.4 - 5.3 ft: Silty SAND, (SM); Grayish red (10R4/2), sand is fine to medium grained, moderately sorted, firm, moist.	Augered to 6.0'.
							40.2	5			6.0 - 7.2 ft: Interlayered SAND and SILT, (SP & ML); Moderate brown (5YR4/4); sand is fine grained, clean, well sorted, moderately firm; silt is very firm; moist.	Augered to total depth of 8.0'.
							39.5				TOTAL DEPTH = 8.0 FT.	3" PVC casing inserted to total depth for gamma-logging.
							38.3					PVC casing was removed after logging and hole was backfilled with drilling spoils.
							37.5					nr = not recorded. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Sears; 200 St. Rt. 17	Last Update: 03-19-92	HOLE NO. C628
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R501
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Muscarelle			N 775.0; E 11280.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-6-90	10-6-90	Hydro Group, Inc.	Soil Sentry		6"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
6.4/80*		0	4	NA	51.0	↓ / none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Lewis R. West						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	P.S.F.	TIME IN MIN.						
SS	2.0	1.0	5				51.0					(Template: MYWD) Complete borehole number is B3890R501. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by drilling with 6" rock bit to depth. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
			8				50.0				0.0 - 2.8 ft: Silty CLAY, (CL); Grayish black (N2), very fine grained; asphalt fragments mixed in top 6".		
			7				49.0						
SS	2.0	1.8	3				48.2				2.8 - 3.8 ft: Silty SAND, (SM); Grayish red (5R4/2), sand is fine grained.		
			3				47.2						
			4				47.0				4.0 - 5.8 ft: Silty SAND, (SM); Dusky red (5R3/4), sand is fine grained; sandstone pebbles, Grayish red (10R4/2), at 5.0'.		
SS	2.0	2.0	12				45.2	5					
			18				44.7				5.8 - 6.3 ft: Silty SAND, (SM); Very dusky red (10R2/2), sand is fine grained.		
			19				43.4				6.3 - 7.6 ft: Silty SAND, (SM); Dusky red (5R3/4), sand is fine grained, with sandstone pebbles; angular crystalline limestone pebble at 6.7'.		
			24				43.0				TOTAL DEPTH = 8.0 FT.		
			28										

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Muscarelle	Last Update: 03-19-92	HOLE NO. R501
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 1	R502			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
Muscarelle			N 7900.0; E 11050.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-6-90	10-6-90	Hydro Group, Inc.		Mobile B-80		8"	10.0	2.0	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
8.5/71		0	6	NA	47.0	none ATD NA		10.0/37.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook						
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.F.	TIME MIN.					
							47.0			(Template: MYWD)	
							46.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R502.
SS	1.5	0.6	18 36 17				45.9			0.5 - 2.2 ft: Silty SAND, (SM); Moderate brown (5YR5/4), sand -60%, silt -30%, rounded to subrounded grains, low plasticity, moist.	Augered through asphalt to 0.5'
SS	2.0	1.6	19 22 23 19				45.0 44.8			2.2 - 4.6 ft: Gravelly, Clayey SAND, (SC); Dark reddish brown (10R3/4), sand is fine to coarse grained -40%, clay -40%, gravel up to 1.5" -20%, angular to rounded, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
SS	2.0	1.6	10 18 19 26				43.4 43.0 42.4	5		4.6 - 7.1 ft: SAND, (SW); Grayish red (5R4/2), fine to coarse grained, subangular to subrounded, no plasticity, moist.	Augered to 6.0'.
SS	2.0	1.5	9 14 17 15				41.4 41.0			7.1 - 7.5 ft: Clayey SILT, (ML); Light brown (5YR5/6), very fine grained, silt -50%, clay -50%, layering present, moderately firm, moist.	Augered to 8.0'.
SS	2.0	1.8	9 15 21 27				39.9 39.5 39.0			8.0 - 9.4 ft: SAND, (SP); Pale brown (5YR5/2), medium to coarse grained, subangular to subrounded, no plasticity, moderately dense, moist.	Augered to 10.0'.
SS	2.0	1.4	12 13 14 20				37.6 37.2 37.0	10		9.4 - 9.8 ft: Clayey SILT, (ML); Moderate yellowish brown (10YR5/4), silt -50%, clay -40%, subangular gravel -10%, micaceous material present, moderately plastic, moist.	Augered to total depth of 12.0'. 3" PVC casing inserted to 11.5' for gamma-logging. PVC casing was removed after logging; and hole was backfilled with drilling spoils.
							35.6 35.0			10.0 - 11.4 ft: Silty GRAVEL, (GM); Dark reddish brown (10R3/4), fine to very coarse grained, subangular to rounded, well graded, dense, wet.	* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
TOTAL DEPTH = 12.0 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Muscarelle

Last Update:
03-19-92

HOLE NO.
R502



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R503				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
Muscarelle			N 7750.0; E 11313.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-6-90	10-6-90	Hydro Group, Inc.		Tripod		3.5"	8.4	1.6	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
7.4/74*		0	5	NA	51.0	V / -8' ATD NA		8.4/42.6				
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	TIME MIN.						
SS	2.0	1.4	3 6 7 5				51.0					
SS	2.0	1.3	6 6 7 4				50.2 50.0 49.6 49.0					
SS	2.0	1.4	6 6 6 16				47.7 47.0					
SS	2.0	1.4	11 7 10 14				45.6 45.0	5				
SS	2.0	1.9	26 34 41 50				43.6 43.0 42.6					
							41.1 41.0	10				
										(Template: MYWD) DESCRIPTION AND CLASSIFICATION 0.0 - 0.8 ft: SILT, (ML); Brownish black (5YR2/1), with root material; clayey between 0.0 - 0.4' and sandy between 0.4 - 0.8'; firm, moist. 0.8 - 1.0 ft: Gravelly SAND, (SW); Brownish black (5YR2/1), moist. 1.0 - 1.4 ft: SAND, (SW); Grayish brown (5YR3/2) mottled with Dark reddish brown (10R3/4), fine grained, minor silt. 2.0 - 3.3 ft: Silty SAND, (SM); Grayish brown (5YR3/2) alternating with Dark reddish brown (10R3/4), roots present, minor pebbles up to 1 cm, firm, moist. 4.0 - 7.4 ft: SAND, (SW); Moderate reddish brown (10R4/6), fine to medium grained, poorly sorted; gravelly between 4.0 - 4.2', minor angular to rounded gravel up to 2 cm below 4.2'; minor silt content decreasing with depth; firm, moist. 8.0 - 8.4 ft: SAND, (SW); Light brown (5YR5/6), medium grained, poorly sorted, firm, wet. 8.4 - 9.9 ft: Sandy GRAVEL, (GW); Dark reddish brown (10R3/4), gravel is primarily sandstone, up to 5 cm, dense, moist. TOTAL DEPTH = 10.0 FT.		
										Complete borehole number is B3890R503. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).		
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Muscarelle		Last Update: 03-19-92		HOLE NO. R503		



GEOLOGIC DRILL LOG

PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R504
SITE Muscarella		COORDINATES N 7800.0; E 11250.0		ANGLE FROM HORIZ Vertical
BEGUN 10-6-90	COMPLETED 10-6-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Soil Sentry	SIZE 6"
CORE RECOVERY (FT./%) 6.1/76*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Lewis R. West

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	1.8	1.0	4/4" 12 14 18				51.0 50.8 49.8 49.0		0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 4.2 ft: Silty CLAY, (CL); Grayish black (N1), very fine grained, angular pebbles up to 2" between 3.2 - 3.6'	Complete borehole number is B3890R504. Drilled through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.6	2 3 4 5				47.4 47.0 46.8		4.2 - 8.0 ft: Silty SAND, (SM); Grayish red (5R4/2) changing to Blackish red (5R2/2) at 7.5', sand is fine grained, few fine rounded pebbles between 5.5 - 6.0'.	Hole advanced to depth by 3" OD split spoon samplers.	
SS	2.0	1.5	9 14 37 39				45.0 44.5 43.0		TOTAL DEPTH = 8.0 FT.	Borehole enlarged by drilling with 6" rock bit to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **Muscarella** Last Update: **03-19-92** HOLE NO. **R504**



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R505**

SITE: **Muscarella** COORDINATES: **N 7,950.0; E 11,144.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-6-90** COMPLETED: **10-6-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **7.2** ROCK (FT.): **0.8** TOTAL DEPTH: **8.0**

CORE RECOVERY (FT./%) **5.6/70*** CORE BOXES: **0** SAMPLES: **5** EL. TOP CASING: **NA** GROUND EL.: **46.5** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **7.2/39.3**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
							46.5				
SS	1.5	0.9	10 25 16				46.3 46.0			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R505.
SS	2.0	1.7	9 10 6 17				45.1 44.5			0.5 - 1.4 ft: Silty SAND, (SM); Moderate brown (5YR3/4); sand is fine to medium grained, subangular to subrounded, -60%; silt -30%, clay <10%; 2" diameter limestone cobble present; moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	9 10 28 13				42.8 42.5 42.2 41.7			2.0 - 4.3 ft: SAND, (SP); Pale brown (5YR5/2) changing to Olive gray (5Y4/1) at 2.8' and to Brownish gray (5YR4/1) at 3.2', fine to medium grained, subangular to subrounded, no plasticity, loose, moist.	Augered to 4.0'.
SS	1.2	1.2	5 15 50/3"				41.2 40.8 40.5	5		4.3 - 4.8 ft: Silty SAND, (SM); Grayish red (10R4/2), very fine to fine grained, rounded to subrounded, low plasticity, moist.	Augered to 6.0'.
SS	0.1	0.1	50/2"				39.3 39.2 38.5			4.8 - 5.3 ft: SAND, (SP); Grayish red (5R4/2), fine to medium grained.	Augered to 6.0'.
										5.3 - 7.2 ft: Silty SAND, (SM); Moderate brown (5YR3/4) changing to Grayish red (10R4/2) at 6.0'; sand is very fine to fine grained, rounded to subrounded, -50 - 60%; silt -40% low plasticity, dense, moist.	Spoon refusal at 7.2'. Additional spoon attempted; spoon refusal at 7.3'.
										7.2 - 7.3 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, rounded, micaceous, iron cement.	Augered to total depth of 8.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 8.0 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **Muscarella** Last Update: **10-08-92** HOLE NO.: **R505**



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. I OF I	HOLE NO. R506
SITE Muscarella		COORDINATES N 7741.0; E 11300.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 10-6-90	COMPLETED 10-6-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 5.7	ROCK (FT.) 0.8
CORE RECOVERY (FT./%) 5.2/80*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 51.0	DEPTH/EL. GROUND WATER 7 / none ATD
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.7	1	3				51.0				0.0 - 1.7 ft: Silty SAND, (SM); Blackish red (5R2/2), with root material, firm, moist.	Complete borehole number is B3890R506.
SS	2.0	1.0	4	5				49.3 49.0 48.3 48.0				2.0 - 2.7 ft: Sandy, Silty GRAVEL, (GM); Blackish red (5YR3/2), gravel is coarse, angular, dense, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	6	8				47.0				2.7 - 5.7 ft: SAND, (SW); Moderate brown (5YR4/4), fine grained, minor silt, pebbles up to 3 cm common, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	0.5	0.5	27-50/0*					45.3 44.5	5			5.7 - 6.5 ft: Sandy GRAVEL, (GW); Dark reddish brown (10R3/4), gravel is primarily sandstone up to 5 cm. dense, moist.	Spoon refusal at 6.5'. Borehole enlarged by driving 3.5" OD split spoon to depth.
TOTAL DEPTH = 6.5 FT.												3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Muscarella	Last Update: 03-19-92	HOLE NO. R506
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R507

SITE

Muscarella

COORDINATES

N 7850.0; E 11045.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

10-6-90

COMPLETED

10-6-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

8.0

ROCK (FT.)

0.0

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

4.3/54*

CORE BOXES

0

SAMPLES EL. TOP CASING

4

NA

GROUND EL.

47.0

DEPTH/EL. GROUND WATER

↓ / none ATD
/ NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS % CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
								47.0				
SS	1.5	0.8	22 13 15					46.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R507. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Augered to 6.0'. Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
								45.7			0.5 - 6.4 ft: Silty SAND (SM); Moderate reddish brown (10R4/6), sand is fine to medium grained, no plasticity, moderately dense, moist.	
SS	2.0	0.3	4 6 7					45.0				
								44.7				
SS	2.0	1.2	1 1 3 7					43.0				
								41.8	5			
SS	2.0	2.0	11 13 15 20					41.0				
								40.6				
								39.0				
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Muscarella

Last Update: 03-19-92

HOLE NO.

R507



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R508
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
Muscarelle			N 7,762.0; E 11,316.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-6-90	10-6-90	Hydro Group, Inc.	Tripod	3"	9.6	0.0	9.6			
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK				
7.0/73*	0	5	NA	50.5	7 / none ATD NA / NA	NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Stephen Knuttel						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.5	4	15				50.5					
			6					50.0				0.0 - 0.5 ft: Clayey SILT, (ML); Grayish black (N2) with root material, firm, moist.	Complete borehole number is B3890R508.
			6					49.5				0.5 - 1.0 ft: GRAVEL, (GW); Dark reddish brown (10R3/4).	
			6					49.0				1.0 - 1.5 ft: Silty SAND, (SM); Grayish red (5R4/2) sand is fine grained, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.5	6					48.5				2.0 - 2.5 ft: Clayey, Sandy GRAVEL, (GC); Moderate reddish brown (10R4/6), moist.	
			5					48.0					Hole advanced to depth by 3" OD split spoon samplers.
			3										
			3										
SS	2.0	1.8	4					46.5				4.0 - 7.7 ft: SAND, (SW); Moderate brown (5YR4/4), fine to medium grained, moderately sorted, with minor silt, very fine layering in sections, firm, moist.	
			5										
			10										
SS	2.0	1.7	18					44.7					
			19					44.5					
			24										
			41										
SS	1.6	1.5	32					42.8				8.0 - 9.5 ft: Sandy GRAVEL interlayered with SAND, (GW & SW); gravel is primarily sandstone, Dark reddish brown (10R3/4), dense, moist; sand is fine grained, Moderate brown (5YR4/4), moist, layers are -0.1 - 0.2' thick.	Spoon refusal at 9.6'. Borehole enlarged by driving 3.5" OD split spoon to depth.
			32					42.5					3" PVC casing inserted to 6.0' for gamma-logging.
			36										PVC casing was removed after logging and hole was backfilled with drilling spoils.
			50/2"					41.0					
								40.9					
TOTAL DEPTH = 9.6 FT.													

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Muscarelle	Last Update: 10-08-92	HOLE NO. R508
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R509			
Muscarelle				N 7868.0; E 11080.0		ANGLE FROM HORIZ		BEARING			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-6-90	10-6-90	Hydro Group, Inc.	Mobile B-80		8"	6.0	0.0	6.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
3.2/53*		0	3	NA	47.0	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.							TIME MIN.
SS	1.5	0.5	8 10 17			47.0 46.8 46.2 46.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R509.
SS	2.0	1.2	17 28 32 34			45.0 43.8				0.5 - 0.8 ft: SAND (SP); Moderate yellowish brown (10YR5/4); fine to medium, subrounded to rounded, grained sand -80%; silt -10%, no plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	10 11 9 8			43.0 42.7 41.5 41.0	5			0.8 - 4.3 ft: Silty SAND (SM); Moderate reddish brown (10R4/6); sand is very fine to fine grained, subrounded to subangular, -50%; silt -30%, low plasticity, poorly graded, moist.	Augered to 4.0'.
TOTAL DEPTH = 6.0 FT.										Augered to total depth of 6.0'.	3" PVC casing inserted to 5.0' for gamma-logging.
										PVC casing was removed after logging and hole was backfilled with drilling spoils.	
										* Core recovery refers to total soil & rock sample.	
										Ground elevation estimated from site topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Muscarelle		Last Update: 03-19-92		HOLE NO. R509	



GEOLOGIC DRILL LOG

PROJECT **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R510**

SITE **Muscarella** COORDINATES **N 7750.0; E 11200.0** ANGLE FROM HORIZ. BEARING **Vertical**

BEGUN **10-6-90** COMPLETED **10-6-90** DRILLER **Hydro Group, Inc.** DRILL MAKE AND MODEL **Soil Sentry** SIZE **3.5"** OVERBURDEN **6.5** ROCK (FT.) **0.0** TOTAL DEPTH **6.5**

CORE RECOVERY (FT./%) **5.4/83*** CORE BOXES **0** SAMPLES **3** EL. TOP CASING **NA** GROUND EL. **50.0** DEPTH/EL. GROUND WATER **NA** DEPTH/EL. TOP OF ROCK **NA/NA**

SAMPLE HAMMER WEIGHT/FALL **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH **none** LOGGED BY: **Lewis R. West**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BL. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							50.0					
SS	2.0	2.0	30				49.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	<p>Complete borehole number is B3890R510.</p> <p>Drilled through asphalt to 0.5'.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth (Note: drill rig transmission broke and hole could not be advanced by augering).</p> <p>3" PVC casing inserted to 4.0' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with drilling spoils.</p>
SS	2.0	1.6	38				45.9				0.5 - 4.1 ft: Silty SAND, (SM); Dusky red (5R3/4), sand is fine to medium grained, increased sand content between 3.0 - 4.0', rounded limestone pebble (1.5" x 2.0") at 2.0', angular sandstone pebble (2" x 2.5") at 4.0'.	
SS	2.0	1.8	30				45.5				4.5 - 5.5 ft: Silty CLAY, (CL); Grayish olive (10Y4/2).	
			32				44.5				5.5 - 6.3 ft: Silty SAND, (SM); Grayish red (5R4/2), sand is fine grained.	
			35				43.7				TOTAL DEPTH = 6.5 FT.	
			40				43.5					

SS = SPLIT SPOON; NQ = CORE BARREL; SITE **Muscarella** Last Update: **03-19-92** HOLE NO. **R510**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES			14501	1 OF 1	R511			
Muscarelle				N 7820.0; E 11180.0			ANGLE FROM HORIZ		BEARING			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-6-90	10-6-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
5.7/71*		0	4	NA	52.0	7 / none ATD NA / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.							TIME MIN.
SS	2.0	1.5	7 6 12 9					52.0			0.0 - 0.5 ft: TOPSOIL, (ML); Grayish black (N2). moist.	Complete borehole number is B3890R511.
								51.5					0.5 - 1.5 ft: Gravelly SAND, (SW); Moderate brown (5YR3/4), gravel up to 0.1' common, with minor silt, firm, moist.
SS	2.0	1.2	6 7 12 17					50.5			2.0 - 2.9 ft: Sandy GRAVEL, (GW); Moderate brown (5YR3/4), well graded, minor silt to gravel up to 0.2' wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
								50.0					2.9 - 3.2 ft: SAND, (SP); Grayish red (10R4/2), medium grained, moderately well sorted, minor silt and clay, firm, moist.
SS	2.0	2.0	24 20 20 19					49.1			4.0 - 7.0 ft: Gravelly, Silty SAND, (SM); Moderate reddish brown (10R4/6) and Dark reddish brown (10R3/4), with some areas of Grayish black (N2); sand is medium grained, poorly sorted, firm, moist; sedimentary clasts composed of silty clay, greenish gray (5GY6/1), present between 5.0 - 6.0'.	Hole advanced to depth by 3" OD split spoon samplers.
								48.8				
SS	2.0	1.0	27 31 37 37					48.0				
								45.0				
								44.0				
TOTAL DEPTH = 8.0 FT.											Borehole enlarged by driving 3.5" OD split spoon to depth.	
											3" PVC casing inserted to 6.0' for gamma-logging.	
											PVC casing was removed after logging and hole was backfilled with drilling spoils.	
											* Core recovery refers to total soil & rock sample.	
											Ground elevation estimated from site topographic map.	
											Description & classification by visual examination of sample.	
											Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE			Last Update: 03-19-92		HOLE NO. R511			
				Muscarelle								



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R512
SITE Muscarelle		COORDINATES N 7800.0; E 11045.0			ANGLE FROM HORIZ./BEARING Vertical	
BEGUN 10-6-90	COMPLETED 10-6-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 10.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 6.1/61*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 47.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
							47.0			(Template: MYWD)	
SS	1.5	0.7	20 12 20				48.8 45.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 4.7 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4); very fine to medium, rounded to subrounded, grains; gravel up to 2" between 2.0 - 4.7', content -5 - 10%; moderately dense, low plasticity, moist.	Complete borehole number is B3890R512. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
SS	2.0	1.7	11 10 12 7				45.0				
SS	2.0	1.4	4 3 6 8				43.3 43.0 42.3	5		4.7 - 5.3 ft: CLAY, (CL); Olive black (5Y2/1), very fine grained, medium plasticity, moderately firm, moist.	
SS	2.0	0.7	3 8 5 6				41.7 41.6 41.0 40.6 40.3			5.3 - 6.4 ft: Silty CLAY, (CL); Greenish gray (5GY6/1), very fine grained, clay -60%, silt -30%, low plasticity, moderately firm, moist. 6.4 - 8.5 ft: SAND, (SP); Olive gray (5Y4/1), fine to medium grained, well sorted, no plasticity, moderately firm.	Augered to 6.0'. Augered to 8.0'.
SS	2.0	1.6	12 7 9 11				39.0 38.5 37.8 37.4 37.0	10		8.5 - 9.2 ft: SAND, (SM); Brownish gray (5YR4/1); layer of rounded to subrounded coarse grained sand between 9.1 - 9.2'; very fine to fine grained sand -50%, silt -40%, clay -10%, well sorted, low plasticity, moist. 9.2 - 9.6 ft: CLAY, (CL); Moderate brown (5YR4/4), very fine grained, with layering -0.5 - 1.0" thick, high plasticity, firm, moist.	Augered to total depth of 10.0'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 10.0 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE Muscarelle	Last Update: 03-19-92	HOLE NO. R512
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GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R513**

SITE: **Muscarelle** COORDINATES: **N 7730.0; E 11035.0** ANGLE FROM HORIZ BEARING: **Vertical**

BEGUN: **10-6-90** COMPLETED: **10-6-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **8.0** ROCK (FT.): **0.0** TOTAL DEPTH: **8.0**

CORE RECOVERY (FT./%): **4.8/60%** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **46.0** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS % CORE RECOVERY	LOSS IN IN.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.						
							46.0					
SS	1.5	0.8	26 18 27				45.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R513.
SS	2.0	1.5	10 12 7 9				44.7				0.5 - 3.5 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6) changing to Dusky yellowish brown (10YR2/2) at 0.9', sand is very fine to fine grained -50%, silt -30%, clay -10 - 20%; gravel -10%, between 0.9 - 3.5', wood fragment between 3.1 - 3.5'; very stiff, dense, no plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.2	5 4 7 10				44.0				4.0 - 4.4 ft: Sandy SILT, (ML); Grayish brown (5YR3/2), very fine to fine grained, gravel <10%, very loose, no plasticity, moist.	Augered to 4.0'.
SS	2.0	1.3	9 17 13 22				42.5 42.0 41.6 41.1 40.8				4.4 - 4.9 ft: Silty CLAY, (CL); Olive black (5Y2/1), very fine grained, medium plasticity, moist.	Augered to 6.0'.
							40.0				4.9 - 6.8 ft: Silty CLAY and SAND, (CL & SP); clay is Greenish gray (5GY6/1), very fine grained, in layers -0.5" thick, medium plasticity, firm; with sand between 6.1 - 6.7', sand is Light olive gray (5Y6/1), fine to medium, rounded to subrounded, well sorted, no plasticity, moderately firm, moist.	Augered to total depth of 8.0'.
							39.2				6.8 - 7.3 ft: SAND, (SP); Brownish gray (5YR4/1), fine to medium grained, rounded to subrounded, well sorted, no plasticity, moderately dense, moist.	3" PVC casing inserted to 7.5' for gamma-logging.
							38.7					PVC casing was removed after logging and hole was backfilled with drilling spoils.
							38.0					
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Muscarelle** Last Update: **03-19-92** HOLE NO.: **R513**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG			PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R515
SITE Muscarelle			COORDINATES N 7852.0; E 11089.0		ANGLE FROM HORIZON Vertical		
BEGUN 10-6-90	COMPLETED 10-6-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 6.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 4.4/73*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 48.0	DEPTH/EL. GROUND WATER NA/NA	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Lewis R. West		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	LOSS	WATER TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						G.P.M.	PRESS. P.S.I.						
SS	2.0	2.0	5	6	7			48.0				0.0 - 5.6 ft: Silty SAND, (SM); Dusky red (5RS/4); sand is fine to medium grained between 0.0 - 2.0'; medium grained below; weathered granitic pebble at 1.0'; rounded gravel between 1.8 - 2.0'; gravel, Grayish olive (10Y4/2) at 3.5'; moist, wet below 2.0'. 5.6 - 6.0 ft: Silty CLAY, (CL); Olive gray (5Y4/2) mottled with Moderate yellowish brown (10YR5/4), fine grained. TOTAL DEPTH = 6.0 FT.	Complete borehole number is B3890R515. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3.5" OD split spoon samplers. 3" PVC casing inserted to 4.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.
SS	2.0	1.4	17	23	24	24		44.6					
SS	2.0	1.0	26	25	27	29		43.0	5				
								42.4					
								42.0					

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Muscarelle	Last Update: 03-19-92	HOLE NO. R515
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GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R516
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING		
Muscarelle			N 7750.0; E 11100.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-6-90	10-6-90	Hydro Group, Inc.	Mobile B-80		8"	8.0	0.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.1/64°		0	4	NA	47.5	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.						
						47.5					
SS	1.5	0.8	18 13 20			47.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R516.
						46.2				0.5 - 1.3 ft: FILL; cobbles, sand, clay, moist.	
SS	2.0	0.7	18 22 20 23			45.5				2.0 - 2.7 ft: Silty SAND, (SM); Grayish red (10R4/2), sand -50%, silt -30%, gravel -20%, subrounded to subangular tabular grains and rounded elongated grains, well graded, moderately dense, no plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	19 21 30 31			43.5				4.0 - 5.1 ft: SAND, (SW); Grayish red (5R4/2); fine to medium, rounded to subrounded, grained sand -90%; rounded gravel, up to -1", -10%; no plasticity, moist.	Augered to 4.0'.
SS	2.0	2.0	12 15 13 34			42.4 41.9 41.5 41.0 40.6 40.1 39.5	5			5.1 - 6.5 ft: Silty SAND, (SM); Pale yellowish brown (10YR6/2) changing to Moderate reddish brown (10R4/6) at 6.0'; fine to coarse, rounded to subangular, grained sand -60%, coarser below 6.0'; silt -20%, gravel -20%, no plasticity, moderately dense, moist.	Augered to 6.0'.
										6.5 - 6.9 ft: SAND, (SP); Pale brown (5YR5/2), fine to medium grained, rounded to subangular, well sorted, moderately dense, moist.	Augered to total depth of 8.0'.
										6.9 - 7.4 ft: Silty SAND, (SM); Pale olive (10Y6/2), sand is very fine to fine grained, subangular to subrounded, low plasticity, moderately firm, moist.	3" PVC casing inserted to total depth for gamma-logging.
										7.4 - 8.0 ft: CLAY, (CL); Greenish gray (5GY6/1), very fine grained, medium plasticity, very firm.	PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 8.0 FT.											

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Muscarelle	Last Update: 03-19-92	HOLE NO. R516
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
Muscarella			N 7795.0; E 11110.0	14501	1 OF 1	R527
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
10-8-90	10-8-90	Hydro Group, Inc.	Tripod	3.5"	8.0	0.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
6.7/84*	0	4	NA	49.0	↓ / none ATD ↓ / NA	0.0/0.0
SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:			
140 lbs/30 in	none		Lewis R. West			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.5	28				49.0				0.0 - 1.5 ft: TOPSOIL, (ML); Dusky brown (5YR2/2), fine grained silt.	Complete borehole number is B3890R527.
SS	2.0	1.8	15 18 18 28				47.5 47.0				2.0 - 3.4 ft: Silty CLAY, (CL); Dusky brown (5YR2/2).	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	22 24 45 24				45.6 45.4 45.2 45.0 44.8				3.4 - 3.6 ft: CLAY, (CL); Light olive gray (5Y5/2), plastic.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.8	33 24 23 13				43.4 43.0				3.6 - 3.8 ft: Silty SAND, (SM); Moderate brown (5YR3/4), fine to medium grained. 4.0 - 4.2 ft: Silty SAND, (SM); Blackish red (5R2/2).	
							41.2 41.0				4.2 - 7.8 ft: Silty SAND, (SM); Grayish red (10R4/2), medium grained, sandstone pebbles between 7.0 - 7.8', wet.	
TOTAL DEPTH = 8.0 FT.											Borehole enlarged by driving 3.5" OD split spoon to depth.	
											3" PVC casing inserted to 7.0' for gamma-logging.	
											PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Muscarella	Last Update: 03-19-92	HOLE NO. R527
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R533
SITE Muscarelle			COORDINATES N 7769.0; E 11024.0			ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 10-9-90	COMPLETED 10-9-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Crane and hammer	SIZE 3.5"	OVERBURDEN 8.0	ROCK (FT.) 0.0	TOTAL DEPTH 8.0	
CORE RECOVERY (FT./%) 5.5/69*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 47.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel				

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
							47.0					
SS	1.5	1.2	15 13 6				46.8 45.3 45.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 1.7 ft: Sandy GRAVEL, (GW); Grayish black (N2) changing to Moderate reddish brown (10R4/6) at 1.1'; gravel between 1.1 - 1.7' is primarily sandstone; minor silt, loose, dry.	Complete borehole number is B3890R533. Asphalt and base rock removed prior to sampling.
SS	2.0	1.0	9 12 6				44.0				2.0 - 4.2 ft: Gravelly, Sandy SILT, (ML); Moderate reddish brown (10R4/6), gravel is primarily sandstone, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	4 4 9 17				43.0 42.8 42.3 41.9 41.7 41.2 41.0				4.2 - 4.7 ft: Sandy GRAVEL, (GW); Grayish black (N2), gravel is coarse, sandstone, minor silt, wet. 4.7 - 5.1 ft: Clayey SILT, (ML); Black (N1), some roots, moderately plastic, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.3	18 22 27 31				40.7 39.7 39.0				5.1 - 5.3 ft: SAND, (SP); Olive gray (5Y4/1), grading with depth from fine to coarse, sharp angular contact with layer below. 5.3 - 5.8 ft: Clayey SILT, (ML); Dark greenish gray (5GY4/1), small root channels present staining sediment with Light olive brown (5Y5/6), plastic, very firm, moist. 5.8 - 6.0 ft: SAND, (SP); Light olive gray (5Y5/2), fine grained, well sorted, firm, moist. 6.0 - 6.3 ft: Sandy GRAVEL, (GW); Greenish black (5GY2/1), with fragments of rounded sandstone, moist. 6.3 - 7.3 ft: SAND, (SW); Grayish red (5R4/2 - 10R4/2), fine to medium grained, poorly sorted, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging; and hole was backfilled with drilling spoils.
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Muscarelle	Last Update: 03-19-92	HOLE NO. R533
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GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R573	
SITE Muscarella		COORDINATES N 7742.0; E 11026.0			ANGLE FROM HORIZ Vertical	BEARING -----	
BEGUN 11-17-90	COMPLETED 11-17-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 13.0	ROCK (FT.) 2.0	
CORE RECOVERY (FT./%) 10.6/71*		CORE BOXES 0	SAMPLES 8	EL. TOP CASING NA	GROUND EL. 46.5	DEPTH/EL. GROUND WATER ↓ / none ATD	DEPTH/EL. TOP OF ROCK 13.0/33.5
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRES. P.S.I.					
						46.5			(Template: MYWD)	
SS	1.5	1.1	10 13 7			46.3 45.8			0.0 - 0.7 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R573.
SS	2.0	1.5	9 20 21 11			44.9 44.5			0.7 - 4.3 ft: Sandy SILT, (ML); Dark reddish brown (10R3/2) changing to Dusky brown (5YR2/2) at 1.4' and to Dusky yellowish brown (10YR2/2) at 2.0', very fine to fine grained; gravel up to -3 cm, -10%, between 2.0 - 4.3'; no plasticity, moist.	Augered through asphalt to 0.5' Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	4 6 13 22			43.0 42.5 42.2			4.3 - 5.0 ft: Clayey SILT, (ML); Grayish black (N2), very fine grained, silt -80%, clay -20%, low plasticity, moist.	Augered to 4.0'
SS	2.0	1.8	16 18 20 28			41.5 41.1 40.7 40.5	5		5.0 - 5.4 ft: Clayey SILT, (ML); Greenish gray (5GY6/1), very fine grained, low plasticity, moist.	Augered to 6.0'
SS	2.0	1.9	4 6 12 17			39.8 39.6 38.7 38.5			5.4 - 9.8 ft: SAND, (SP); Olive gray (5Y4/1) changing to Moderate brown (5YR4/4) at 6.9'; layer of fine to very coarse grained sand, poorly sorted, between 6.7 - 6.9'; very fine to fine grained, well sorted, no plasticity, moist.	Augered to 8.0'
SS	2.0	0.6	7 10 16 27			36.7 36.6 36.5 35.9	10		9.8 - 12.8 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to coarse grained -70%, silt -30%, no plasticity, wet.	Augered to 10.0'
SS	0.9	0.8	17 50/5"			34.5				Augered to 12.0'. Spoon refusal at 12.9'. Augered to 13.0'. Spoon refusal at 14.8'. Augered to total depth of 15.0'. 3" PVC casing inserted to 14.5' for gamma-logging.
SS	1.8	1.1	17 34 37 50/4"			33.7 33.5			13.0 - 14.1 ft: SANDSTONE; Dark reddish brown (10R3/4), grains are -50% very fine to fine sand size and -50% silt size, blocky, iron-oxide cement, no plasticity.	PVC casing was removed after logging and hole was backfilled with drilling spoils.
						31.5	15		TOTAL DEPTH = 15.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Muscarella	Last Update: 03-19-92	HOLE NO. R573
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R574

SITE

Muscarella

COORDINATES

N 7800.0; E 11035.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

11-17-90

COMPLETED

11-17-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

12.0

ROCK (FT.)

0.0

TOTAL DEPTH

12.0

CORE RECOVERY (FT./%)

8.0/67*

CORE BOXES

SAMPLES

SEL. TOP CASING

0

6

GROUND EL.

46.5

DEPTH/EL. GROUND WATER

-5' ATD

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLINDS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								46.5				(Template: MYWD)	
SS	1.5	1.3		25 25 23				46.3 48.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R574.
SS	2.0	1.2		15 15 12 9				44.7 44.5				0.5 - 3.1 ft: Gravelly, Sandy SILT, (ML); Dark reddish brown (10R3/4) changing to Grayish red (5R4/2) at 2.7'; sand is fine to medium grained, content increases with depth; gravel is sandstone, minor wood fragments and roots, firm, slightly moist.	Augered through asphalt to 0.5'
SS	2.0	0.7		6 6 9 14				43.4 43.3				3.1 - 4.3 ft: Clayey SILT, (ML); Black (N2), minor sand; minor angular gravel of mixed composition between 4.0 - 4.3'; slightly plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4		15 19 23 32				42.5 42.2 41.8	5			4.3 - 4.7 ft: Sandy CLAY, (CL); Grayish green (5G5/2), sand is very fine to fine grained, slightly layered, moderately plastic, firm, moist.	Augered to 6.0'.
SS	2.0	1.7		12 14 23 28				40.5				6.0 - 7.4 ft: SAND, (SP); Dark yellowish brown (10YR4/2) changing to Pale brown (5YR5/2) at 6.5'; grading with depth from medium to coarse grained between 6.0 - 6.5', fine grained below; moderately well sorted, loose changing to firm below 6.0', wet.	Augered to 8.0'.
SS	2.0	1.7		15 17 19 21				39.1 38.5				8.0 - 10.4 ft: SAND, (SW); Dark yellowish brown (10YR4/2), fine to medium grained, with some coarse grains and rounded pebbles, moderately sorted, loose, wet.	Augered to 10.0'.
								36.8 36.5 36.1	10			10.4 - 11.7 ft: Interlayered SILT and SAND, (ML & SP); Light brown (5YR5/6) to Moderate brown (5YR4/4), silt is firm, slightly moist; sand is fine grained, moderately well sorted, clean, loose, wet.	Augered to total depth of 12.0'.
								34.8 34.5				TOTAL DEPTH = 12.0 FT.	3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Muscarella

Last Update:
03-19-92

HOLE NO.

R574



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
			FUSRAP	14501	1 OF 1	R575
SITE		COORDINATES			ANGLE FROM HORIZ BEARING	
Muscarella		N 7800.0; E 11025.0			Vertical	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
11-17-90	11-17-90	Hydro Group, Inc.	Soil Sentry	8"	8.0	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
4.6/58*		0	4	NA	46.5	/ none ATD
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
							46.5				(Template: NYWD)	
SS	1.5	1.3	15 17 14				48.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R575.
SS	2.0	0.8	18 12 9 7				44.7 44.5 43.7				0.5 - 4.2 ft: Gravelly, Sandy SILT, (ML); Dark reddish brown (10R3/4), sand is fine to medium grained, gravel is sandstone, firm, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	6 6 8 12				42.5 42.3 42.1 41.8 41.2				4.2 - 4.4 ft: Clayey SILT, (ML); Black (N1), minor sand, slightly plastic, firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.2	7 10 15 29				40.5 39.5 39.3 38.5				4.4 - 4.7 ft: Sandy CLAY, (CL); Grayish green (10GY5/2), sand is very fine to fine grained, moderately plastic, firm, moist. 4.7 - 5.3 ft: SAND, (SW); Light olive gray (5Y5/2), fine grained, moderately sorted, clean between 4.9 - 5.1', clayey elsewhere, firm, moist.	
											6.0 - 7.0 ft: Silty CLAY and Sandy CLAY, (CL); Grayish green (10GY5/2); stringers of very fine to fine grained sand throughout; moderately plastic, firm, moist. 7.0 - 7.2 ft: SAND, (SP); Light olive brown (5Y5/6) to Moderate brown (5YR4/4), fine grained, moderately well sorted, firm, moist.	Augered to total depth of 8.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE	Muscarella	Last Update:	HOLE NO.
		03-19-92	R575



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R576
SITE Muscarella		COORDINATES N 7850.0; E 11020.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 11-17-90	COMPLETED 11-17-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 8.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 6.1/76*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 47.0	DEPTH/EL. GROUND WATER ↓ / none ATD ↓ / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.F. TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						47.0			(Template: MYWD)	
SS	1.5	0.9	6 10 11			46.7 46.5			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R576.
SS	2.0	1.6	8 7 6 5			45.6 45.0			0.5 - 1.4 ft: Clayey SILT, (ML); Grayish brown (5YR3/2), silt -60%, clay -20%, gravel up to 3 cm -20%, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
SS	2.0	2.0	1 3 4 15			43.4 43.0			2.0 - 5.2 ft: Sandy SILT, (ML); Moderate brown (10YR3/4), silt -70%, clay -30%, no plasticity, moist.	
SS	2.0	1.6	8 7 14 30			41.8 41.5 41.1 40.8 40.3 40.0 39.4 39.0	5		5.2 - 5.5 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2), mottled; silt -70%, Clay -30%, moderately plastic, moist. 5.5 - 6.2 ft: Silty CLAY, (CL); Greenish gray (5GY6/1), mottled; clay -70%, silt -30%; gradationally changing to Clayey Silt at 5.9'; moderately plastic, moist.	Augered to 6.0'.
									6.2 - 6.7 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2), sand -80%, silt -20%, no plasticity, moderately dense, moist. 6.7 - 7.0 ft: Clayey SILT, (ML); Moderate yellowish brown (10YR5/4), silt -80%, clay -20%, no plasticity, very stiff, moist. 7.0 - 7.6 ft: SAND, (SP); Pale yellowish brown (10YR6/2), fine to medium grained, rounded to subrounded grains, well sorted, no plasticity, moderately dense, moist.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 8.0 FT.										

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Muscarella	Last Update: 03-19-92	HOLE NO. R576
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R514
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 7727.0; E 10997.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-6-90	10-6-90	Hydro Group, Inc.	Tripod		3.5"	3.6	0.0	3.6		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
2.9/81*		0	2	NA	46.5	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.						
SS	2.0	1.8	4 9 4 6			46.5 46.1				0.0 - 0.4 ft: TOPSOIL, (SM); Grayish black (N2).	Complete borehole number is B3890R514.
SS	1.6	1.1	9 11 15 50/1"			44.7 44.5 43.9 43.4 42.9			0.4 - 1.8 ft: Silty SAND to Sandy SILT, (SM - ML); Blackish red (5R2/2) to Grayish brown (5YR3/2), layers of Silty Clay, Light olive gray (5Y5/2) between 0.9 - 1.0' and 1.5 - 1.8' with varying amounts of gravel, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
											2.0 - 2.6 ft: Sandy SILT, (ML); Grayish black (N2), moist.	Hole advanced to depth by 3" OD split spoon samplers.
										2.6 - 3.1 ft: Gravelly SILT, (ML); Dark reddish brown (10R3/4), with sand, firm, moist.	Spoon refusal at 3.6'. gamma-logging completed in open borehole.
										TOTAL DEPTH = 3.6 FT.		Hole backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	last Update: 03-19-92	HOLE NO. R514
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R517
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 8051.0; E 11054.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-8-90	10-8-90	Hydro Group, Inc.	Tripod	3.5"	8.0	0.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
6.2/78*		0	4	NA	45.5	5.6 / NA	NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Lewis R. West						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						P.S.I.	TIME MIN.						
SS	2.0	1.6	4	6				45.5				0.0 - 0.9 ft: TOPSOIL, (ML); Pale brown (5YR5/2).	Complete borehole number is B3890R517. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.2	7	15				44.6				0.9 - 3.2 ft: Clayey SILT, (ML); Grayish brown, (5YR5/2) changing to Dark reddish brown (10R3/4) at 3.2' and to Dusky brown (5YR2/2) at 3.4', very fine grained, angular pebbles between 1.5 - 1.6'.	
SS	2.0	1.6	15	21				43.9					
SS	2.0	1.6	22	31				42.5					
SS	2.0	1.6	42	30				41.5				4.0 - 5.6 ft: Silty SAND, (SM); Blackish red (5R2/2), sand is fine to medium grained, wet.	
SS	2.0	1.8	48	28				39.9	5			6.0 - 7.8 ft: Silty CLAY, (CL); Dusky red (5Y3/4), very fine grained, angular sandstone pebbles between 6.5 - 7.5'.	
								37.7				TOTAL DEPTH = 8.0 FT.	
								37.5					

SS = SPLIT SPOON; NG = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R517
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
National Community Bank				FUSRAP		14501	1 OF 1	R518			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
National Community Bank			N 7734.0; E 11009.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-8-90	10-8-90	Hydro Group, Inc.		Tripod		3.5"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.8/73*		0	4	NA	47.0	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in			none		Stephen Knuttel						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
										DESCRIPTION AND CLASSIFICATION	
SS	2.0	1.4	2 2 9				47.0			0.0 - 1.0 ft: TOPSOIL, (ML); Grayish black (N2), with gravel and fine roots, soft, moist.	Complete borehole number is B3890R518.
SS	2.0	1.8	9 17 28 26				46.0 45.6 45.0 44.6 44.2			1.0 - 2.4 ft: Sandy SILT, (ML); Pale brown (5YR5/2) mottled with Grayish black (N2) and Grayish green (5GY5/2), firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	16 13 6 6				43.5 43.2 43.0 42.6 42.0 41.9			2.4 - 2.8 ft: SILT, (ML); Grayish black (N2), minor sand, firm, moist. 2.8 - 3.5 ft: Gravelly Silty SAND, (SM); Moderate reddish brown (10R4/6), sand is fine to medium grained, moderately sorted, firm, slightly moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.5	6 6 6 16				41.0 40.7 39.5 39.0			3.5 - 4.4 ft: Sandy GRAVEL, (GM); Olive black (5Y2/1), with silt, sand is fine to medium grained, moist. 4.4 - 5.0 ft: Gravelly Silty SAND, (SM); Moderate reddish brown (10R4/6), sand is fine to medium grained, moderately sorted, firm, slightly moist. 5.0 - 6.3 ft: SILT, (ML); Black (N1), fine roots present, minor sand, moist, gradational change with unit below. 6.3 - 7.5 ft: Silty CLAY, (CL); Grayish green (10GY5/2 mottled with 5GY5/2) with small spotted areas of Moderate reddish orange (10R6/6), root channels present throughout, slightly plastic, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 6.0' for gamma-logging.
TOTAL DEPTH = 8.0 FT.										PVC casing was removed after logging and hole was backfilled with drilling spoils.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER										* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SITE						Last Update:		HOLE NO.			
National Community Bank						03-19-92		R518			



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP		14501	1 OF 1	R520		
SITE			COORDINATES				ANGLE FROM HORIZ	BEARING		
National Community Bank			N 8000.0; E 11050.0				Vertical	-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-8-90	10-8-90	Hydro Group, Inc.	Tripod		3.5"	8.5	0.0	8.5		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
7.0/82*		0	4	NA	47.0	5.5 / NA	NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Lewis R. West					
SAMP. AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
									DESCRIPTION AND CLASSIFICATION	
					47.0					
SS	2.0	1.8	28		46.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R520.
			28		45.6				0.5 - 1.4 ft: Clayey SILT, (ML); Blackish red (5R2/2), very fine grained.	
			28		45.4				1.4 - 1.6 ft: ASPHALT.	Asphalt and base rock cut to 0.5'; spoons started at 0.5'.
SS	2.0	1.7	28		44.9				1.6 - 7.9 ft: Silty SAND, (SM); Moderate brown (5YR4/4), interlayered with Clay between 3.5 - 4.0', and with Silty Clay between 6.0 - 6.3', sand is fine to medium, moist.	
			28		44.5					Borehole sampled and gamma-logged by TMA/Eberline Corp.
			28		42.8					
SS	2.0	1.8	32		42.5					Hole advanced to depth by 3" OD split spoon samplers.
			30							
			26							
			28							
SS	2.0	1.9	16		40.7					
			18		40.5					
			27							
			32							
					39.1					
					38.6				7.9 - 8.4 ft: Silty CLAY, (CL); Moderate brown (5YR3/4), fine grained, moderately plastic, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
					38.5					
									TOTAL DEPTH = 8.5 FT.	3" PVC casing inserted to 5.0' for gamma-logging.
										PVC casing was removed after logging and hole was backfilled with drilling spoils.
										* Core recovery refers: to total soil & rock sample.
										Ground elevation estimated from site topographic map.
										Description & classification by visual examination of sample.
										Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Last Update:		HOLE NO.		
			National Community Bank			03-19-92		R520		



GEOLOGIC DRILL LOG			PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R521
SITE National Community Bank			COORDINATES N 7950.0; E 10850.0		ANGLE FROM HORIZ BEARING Vertical		
BEGUN 10-8-90	COMPLETED 10-8-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 8.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 6.6/83*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 48.0	DEPTH/EL. GROUND WATER none ATD	
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook			

SAMP TYPE AND DIA.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
							48.0				(Template: MYWD)	
SS	1.5	1.2	7 17 20				47.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R521.
SS	2.0	1.6	10 19 15 16				46.3 46.0 45.4				0.5 - 2.6 ft: FILL; Silty Sand; Moderate brown (5YR3/4), with minor clay and cobbles up to 2.0", moist.	Augered through asphalt to 0.5'.
SS	2.0	1.8	5 10 24 37				44.4 44.0 43.5				2.6 - 3.6 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), very fine to medium grained, subrounded, well sorted, no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	1 11 15 23				43.2 42.8 42.2 42.0 41.4 41.0	5			4.0 - 4.5 ft: Gravelly, Silty SAND, (SM); Dusky yellowish brown, (10YR2/2), sand -40%, gravel -30%, silt -30%.	Augered to 4.0'.
							42.2 42.0 41.4 41.0				4.5 - 4.8 ft: Silty SAND, (SM); Pale brown (5YR3/2), fine to medium, rounded, grains; interlayered with Silty Clay, Greenish gray (5GY6/1), moderately plastic; -1" thick layers.	Augered to 6.0'.
							40.0				4.8 - 5.2 ft: Clayey SILT, (ML); Brownish black (5YR2/1), silt -60%, clay -15%, sand -15%, some organics, no plasticity, moist.	Augered to total depth of 8.0'.
											5.2 - 5.8 ft: SAND, (SW); Dark yellowish brown (10YR4/2); subrounded to subangular gravel, up to 0.5", -5%; dense, moist.	3" PVC casing inserted to 7.0' for gamma-logging.
											6.0 - 6.6 ft: Silty SAND, (SM); Moderate brown (5YR3/4) changing to Grayish brown (5YR3/2) at 6.2', fine to medium grained, sand -55%, silt -35%, no plasticity, moist.	PVC casing was removed after logging and hole was backfilled with drilling spoils.
											6.6 - 7.0 ft: SAND, (SP); Dark yellowish brown (10YR4/2), mottled; fine to medium grained, rounded to subrounded, no plasticity, moist.	
											7.0 - 8.0 ft: Silty SAND, (SM); Greenish gray (5GY6/1), sand -70%, silt -30%, organics <5%, medium dense, moist.	
TOTAL DEPTH = 8.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE National Community Bank	Last Update: 03-19-92	HOLE NO. R521
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GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R522**

SITE: **National Community Bank** COORDINATES: **N 7715.0; E 10983.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **10-8-90** COMPLETED: **10-8-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Tripod** SIZE: **3.5"** OVERBURDEN: **9.2** ROCK (FT.): **0.0** TOTAL DEPTH: **9.2**

CORE RECOVERY (FT./%): **7.4/80*** CORE BOXES: **0** SAMPLES: **5** SEL. TOP CASING: **NA** GROUND EL.: **46.0** DEPTH/EL. GROUND WATER: **none ATD** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						P.S.T.	TIME MIN.						
SS	2.0	1.1	2	2				46.0				0.0 - 0.6 ft: TOPSOIL, (ML); Grayish black (N2), fine roots present, soft, moist.	Complete borehole number is B3890R522. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Spoon full of slough and would not advance beyond 7.7'. Spoon refusal at 9.2'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
			2	2				45.4				0.6 - 4.7 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), minor gravel between 0.6 - 1.1', increased gravel content below 2.0', soft between 0.8 - 1.1', firm below, moist, wet in places between 4.0 - 4.7'.	
SS	2.0	1.6	2	2				44.0					
			2	2				42.5					
SS	2.0	1.7	2	2				42.0					
			4	4				41.3					
			11	11				40.5	5			4.7 - 5.5 ft: Clayey SILT, (ML); Grayish black (N2) to Grayish brown (5YR3/2), roots abundant, minor sand, moderately firm, moist.	
SS	1.7	1.6	4	6				40.3				5.5 - 5.7 ft: CLAY, (CL); Grayish green (10GY5/2 mottled with 5G5/2), moderately plastic, firm, moist.	
			12	12				38.7				6.0 - 7.3 ft: SAND, (SP); Moderate brown (5YR4/4), fine to medium grained, moderately well sorted, clean, moderately firm, wet.	
			50/3"	50/3"				38.5				7.3 - 7.5 ft: Clayey SILT, (ML); Grayish green (10GY5/2 mottled with 5G5/2), plastic, firm, moist.	
SS	1.5	1.5	16	22				38.4				7.5 - 7.7 ft: SAND, (SW); Grayish green (10GY5/2), fine grained, moderately sorted, firm, moist.	
			22	22				38.3				7.7 - 8.8 ft: SAND, (SP); Moderate brown (5YR4/4), fine grained grading with depth to medium, moderately well sorted, clean, firm, moist, sharp angular contact.	
			47	47				37.2				8.8 - 9.2 ft: Clayey SILT, (ML); Pale brown (5YR2/2), little plasticity, very firm, moist.	
								36.8				TOTAL DEPTH = 9.2 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **National Community Bank** Last Update: **03-19-92** HOLE NO.: **R522**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R523
SITE National Community Bank			COORDINATES N 7950.0; E 10950.0			ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 10-8-90	COMPLETED 10-8-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 10.0	ROCK (FT.) 0.0	TOTAL DEPTH 10.0
CORE RECOVERY (FT./%) 5.9/59*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 48.0	DEPTH/EL. GROUND WATER -8.0' ATD		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS % CORE RECOVERY	LOSS IN G.P.M.	WATER TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
SS	1.8	1.4	9/4" 8 7 9				48.0 47.8			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R523. Asphalt cut to 0.2'; spoon started at 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.5	10 12 15 21				46.4 46.0			0.2 - 6.4 ft: Gravelly, Sandy SILT, (ML); Brownish black (5YR2/1) changing to Grayish brown (5YR3/2) at 2.0'; gravel is primarily sandstone, Moderate reddish brown (10R4/6); content decreases with depth; clasts of Clayey Silt, Greenish Gray (5GY6/1) present between 2.0 - 3.5', moderately firm to firm with depth, slightly moist.	
SS	2.0	1.0	32 19 16 17				44.5 44.0	5			
SS	2.0	0.4	16 9 10 22				43.0 42.0 41.6				
SS	2.0	1.6	19 27 37 32				40.0 39.2 38.7 38.4 38.0	10		8.0 - 8.8 ft: SILT, (ML); Grayish black (N1), with lenses of fine sand, firm, wet. 8.8 - 9.3 ft: Sandy, Clayey SILT, (ML); Greenish gray (5GY6/1), slightly mottled, slightly plastic, firm, moist.	
										9.3 - 9.6 ft: SAND, (SP); Grayish brown (5YR3/2), interlayered fine and medium grained sands, layers are moderately well sorted, moderately firm, moist.	
TOTAL DEPTH = 10.0 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

National Community Bank

Last Update:
03-19-92

HOLE NO.
R523



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R524
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
National Community Bank			N 8050.0; E 10950.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-8-90	10-8-90	Hydro Group, Inc.		Mobile B-80	8"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.5/69*		0	4	NA	47.5	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
							47.5				
SS	1.6	1.0	7 10 11				47.0			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R524.
SS	2.0	1.4	8 11 21				46.0 45.5 45.2			0.5 - 2.3 ft: Silty SAND, (SM); Moderate brown (5YR3/4); gravel -15%, content decreasing with depth; minor clay, moist.	Augered through asphalt to 0.5'.
SS	2.0	1.5	8 13 19 30				44.1 43.5 43.2			2.3 - 4.3 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2), very fine to fine grained, silt -50%, clay -30, sand -10%, subrounded to subangular pebbles -5%, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.8	1.6	39 38 33 50/3*				42.0 41.5 40.9			4.3 - 5.5 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2) interlayered with Moderate reddish brown (10R4/6), colored layers are -0.25 - 0.5" thick, mottled; sand content increases with depth, moist.	Augered to 4.0'.
							39.9 39.5			6.0 - 6.6 ft: Clayey SILT, (ML); Brownish black (5YR2/1) mottled with Greenish gray (5GY6/1) and Moderate reddish brown (10R4/8), no plasticity, firm, moist.	Augered to 6.0'.
										6.6 - 7.6 ft: Sandy SILT, (ML); Moderate brown (5YR3/4), very fine to fine grained, well sorted, no plasticity, moist.	Spoon refusal at 7.8'.
TOTAL DEPTH = 8.0 FT.										Augered to total depth of 8.0'.	3" PVC casing inserted to 7.5' for gamma-logging.
										PVC casing was removed after logging and hole was backfilled with drilling spoils.	

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R524
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R525

SITE
National Community Bank

COORDINATES
N 7950.0; E 11050.0

ANGLE FROM HORIZON
Vertical

BEGUN
10-8-90

COMPLETED
10-8-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL
Tripod

SIZE
3"

OVERBURDEN
3.5

ROCK (FT.)
0.0

TOTAL DEPTH
3.5

CORE RECOVERY (FT./%)
3.0/86*

CORE BOXES
0

SAMPLES
2

EL. TOP CASING
NA

GROUND EL.
47.0

DEPTH/EL. GROUND WATER
none ATD
NA

DEPTH/EL. TOP OF ROCK
NA/NA

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH
none

LOGGED BY:

Lewis R. West

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS 2" CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.					
SS	2.0	1.5	40 35 32 30				47.0 46.9 46.5		0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R525. Spoon driven through asphalt layers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 3.5'. 3" PVC casing inserted to 3.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
							45.5 45.4 45.0		0.5 - 1.5 ft: Silty CLAY, (ML); Dusky yellowish brown (10YR2/2), very fine grained.		
SS	1.5	1.5	35 38 50/6"						1.5 - 1.65 ft: ASPHALT.		
							43.5		2.0 - 3.5 ft: Silty SAND, (SM); Moderate yellowish brown (10YR5/4), fine grained.		
TOTAL DEPTH = 3.5 FT.											

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NA = CORE BARREL;
HX = HAND AUGER; 0 = OTHER

SITE

National Community Bank

Last Update:
03-19-92

HOLE NO.
R525



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
			FUSRAP	14501	1 OF 1	R526
SITE		COORDINATES			ANGLE FROM HORIZ BEARING	
National Community Bank		N 8025.0; E 10975.0			Vertical -----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
10-8-90	10-8-90	Hydro Group, Inc.	Mobile B-80	8"	8.0	0.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
5.1/64*		0	4	NA	46.5	↓ / none ATD ↓ / NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:	
140 lbs/30 in		none			Robert Cook	

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
							46.5					
SS	1.5	1.2	6 16 14				46.3 46.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R526.
SS	2.0	1.6	9 9 6				44.8 44.5				0.5 - 1.7 ft: Sandy SILT, (ML); Dusky yellowish brown (10YR2/2), fine to coarse grained, no plasticity, medium dense, moist.		Augered through asphalt to 0.5'.
SS	2.0	0.5	1 1 2				42.9 42.5 42.0				2.0 - 3.6 ft: Silty SAND, (SM); Olive gray (5Y4/1), very fine to medium grained, rounded to subrounded, loose, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.8	1.8	8 23 24 22				40.5 39.6 38.7 38.5	5			4.0 - 6.9 ft: Silty SAND, (SM); Dark yellowish brown (10YR4/2) mottled with Light greenish gray (5G8/1) and Moderate reddish brown (10R4/6), fine to medium grained, subrounded to subangular, moist.	Augered to 4.0'.
											6.9 - 7.8 ft: Silty SAND, (SM); Pale brown (5YR5/2); fine to medium grained, subangular to subrounded, sand -70%; silt -25%. Gravel <5%, no plasticity, moist.	Augered to 6.0'.
											TOTAL DEPTH = 8.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R526
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R528

SITE

National Community Bank

COORDINATES

N 7850.0; E 10800.0

ANGLE FROM HORIZON

Vertical

BEARING

BEGUN

10-8-90

COMPLETED

10-8-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

8.0

ROCK (FT.)

0.0

TOTAL DEPTH

8.0

CORE RECOVERY (FT./%)

6.5/81*

CORE BOXES

0

SAMPLES

4

EL. TOP CASING

NA

GROUND EL.

47.0

DEPTH/EL. GROUND WATER

∇ / none ATD
/ NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.						
								47.0			(Template: MYWD)	
								46.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R528.
SS	1.5	1.5	8 19 50					45.5			0.5 - 3.0 ft: Gravelly, Sandy SILT, (SM); Grayish brown (5YR3/2) mottled with Dusky brown (5YR2/2), gravel up to 2.0", firm, slightly moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	8 13 20 20					45.0			3.0 - 3.7 ft: SAND, (SM); Dusky yellowish green (5GY5/2); interlayered with Sandy Silt, Dark yellowish brown (10YR4/2), Grayish black (N2), with wood fragment below 3.6'.	Augered to 4.0'.
SS	2.0	1.3	6 6 4 6					44.0			4.0 - 5.0 ft: Gravelly SAND, (SM); Dusky brown (5YR2/2), minor silt and root material; clasts of Clayey Silt, Grayish olive (10Y4/2); sharp contact with layer below.	Augered to 6.0'.
SS	2.0	2.0	4 12 21 23					43.3 43.0			5.0 - 5.3 ft: SAND, (SW); Moderate brown (5YR3/4), fine to medium grained, poorly sorted, rounded pebbles up to 1 cm common, loose, moist.	Augered to total depth of 8.0'. 5" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
								42.0 41.7	5		6.0 - 6.9 ft: Gravelly, Silty SAND, (SW); Dusky brown (5YR2/2), firm, moist, sharp contact with layer below.	
								41.0			6.9 - 7.1 ft: SAND, (SP); Moderate brown (5YR3/4), fine grained, minor gravel.	
								40.1			7.1 - 7.4 ft: Silty SAND, (SM); Grayish green (10GY5/2) mottled with Dark reddish brown (10R3/4), sand is fine grained, moist.	
								39.9 39.6 39.0			7.4 - 8.0 ft: SAND, (SW); Grayish red (5R4/2), medium grained, poorly sorted, with sandstone pebbles up to -0.2', no apparent layering.	
											TOTAL DEPTH = 8.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

National Community Bank

Last Update: 03-19-92

HOLE NO.

R528



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
National Community Bank				FUSRAP		14501	1 OF 1	R529				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
National Community Bank			N 7950.0; E 11045.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
10-8-90	10-8-90	Hydro Group, Inc.		Mobile B-80	8"	7.6	2.4	10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.2/62*		0	5	NA	47.0	none ATD / NA		7.6/39.4				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.					
								47.0			(Template: MYWD)	
SS	1.5	1.0		9 9 36				46.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R529.
SS	2.0	1.2		29 28 39 29				45.6 45.5 45.0 44.8			0.5 - 2.2 ft: FILL; Sandy Silt; Dusky brown (5YR2/2), silt -50%, sand -30%, with brick fragments and cobbles, asphalt between 1.4 - 1.5', gravel between 2.0 - 2.2'. 2.2 - 4.7 ft: SAND, (SP); Moderate yellowish brown (10YR5/4), fine to medium grained, subangular to subrounded, no plasticity, dense, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
SS	2.0	1.5		20 22 30 50				43.0 42.3 41.7 41.5 41.0	5		4.7 - 5.3 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), with fine cobbles, granitic, up to 2". 5.3 - 5.5 ft: Clayey SILT to Silty CLAY, (ML); Dusky yellowish brown (10YR2/2) mottled with Greenish gray (5GY6/1) and Grayish red (5R4/2), moist.	Augered to 6.0'.
SS	2.0	2.0		20 22 30 50				39.4 38.5			6.0 - 7.6 ft: Clayey SILT, (ML); Moderate brown (5YR3/4), very fine to fine grained, silt -60%, clay -30%. 7.6 - 8.5 ft: Clayey GRAVEL, (GC); Dark reddish brown (10R3/4), fine grained material to gravel, no plasticity, moist; changing to Sandstone, Grayish red (10R4/2), fine grained, iron-oxide cement, weathered, dry, at 8.0'.	Augered to 8.0'. Spoon refusal at 8.5'.
SS	0.5	0.5		50/6"				37.0	10		TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER		SITE		National Community Bank				Last Update: 03-19-92		HOLE NO. R529		



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	C530
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 7735.0; E 11009.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
10-9-90	10-9-90	Hydro Group, Inc.	Tripod		3"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.5/69*		0	4	NA	47.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.8	2	7				47.0				0.0 - 1.4 ft: TOPSOIL, (ML) ; Grayish black (N2), with gravel, fine roots present, soft, moist.	Complete borehole number is B3890C530. Borehole sampled by TMA/Eberline Corp. Borehole was not gamma-logged; hole is 1' north of Hole R518. After sampling, hole was grouted to -4' below surface and remaining hole was backfilled with drilling spoils.
			8					45.6				1.4 - 2.6 ft: SAND, (SP) ; Moderate brown (5YR4/4), fine grained, moderately well sorted, moist.	
SS	2.0	1.4	9	19				45.0				2.6 - 3.2 ft: Gravelly, Silty SAND, (SM) ; Moderate reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, firm, slightly moist.	
			31	42				44.4				3.2 - 3.4 ft: Sandy GRAVEL, (GM) ; Olive black (5Y2/1), with silt, sand is fine to medium grained, moist.	
SS	2.0	1.6	21	16				43.8	5			4.0 - 5.2 ft: Gravelly, Silty SAND, (SM) ; Moderate reddish brown (10R4/6), increased silt content between 4.0 - 4.6', sand is fine to medium grained, moderately sorted, firm, slightly moist.	
			8	9				43.6				5.2 - 6.7 ft: SILT, (ML) ; Black (N1), fine roots present, minor sand, moist.	
			9					43.0				6.7 - 6.9 ft: Silty CLAY, (CL) ; Grayish green (10GY5/2), plastic, firm, moist.	
SS	2.0	0.9	14	15				41.8				TOTAL DEPTH = 8.0 FT.	
			9	20				41.4					
								40.3					
								40.1					
								39.0					

SS = SPLIT SPOON; NQ = CORE BARREL; SITE National Community Bank Last Update: 03-19-92 HOLE NO. C530
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE National Community Bank				COORDINATES N 7727.0; E 10998.0		14501	1 OF 1	R531			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-9-90	10-9-90	Hydro Group, Inc.		Tripod	3.5"	7.0	0.0	7.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
4.7/63*		0	3	NA	46.5	6-7' ATD NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLMS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.7	2 3 9 10			46.5			(Template: MYWD)		
SS	2.0	1.5	12 20 22 25			46.0 45.3 44.8 44.5 43.9			0.0 - 0.5 ft: TOPSOIL, (ML); Grayish black (N2), fine roots present, soft, moist. 0.5 - 1.2 ft: Gravelly Silty SAND, (SM); Blackish red (5R2/2) mottled with Grayish red (10R4/2), rounded gravel, minor roots and sedimentary clasts composed of Clayey Silt, firm, moist. 1.2 - 1.7 ft: Clayey SILT, (ML); Dark greenish gray (5GY4/1), minor gravel and sand, very firm, moist.	Complete borehole number is B3890R531. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.	
SS	3.0	1.5	15 12 wor/18* 8			43.0 42.5 42.0 41.7 41.0	5		2.0 - 2.6 ft: Sandy SILT, (ML); Grayish black (N2), minor root material present; wood fragment between 2.4 - 2.6'; soft, moist. 2.6 - 4.5 ft: Gravelly Sandy SILT, (ML); Moderate reddish brown (10R3/4) gradually changing to Dark reddish brown (10R3/4) with depth; increased sand between 3.0 - 3.5'; increased gravel between 4.0 - 4.5'; firm, moist.	Spoon fell in hole from 5.0 - 6.5'; assumed void. Spoon driven from 4.0 - 7.0'	
						39.5			4.4 - 4.8 ft: Gravelly SILT, (ML); Grayish black (N2), soft, moist. 4.8 - 5.5 ft: SAND interlayered with Gravelly SAND, (SW); Yellowish brown (10YR5/4) to Moderate Brown (5YR4/4), gravel is rounded, sand is medium grained, poorly sorted, loose, moist to wet.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 6.0' for gamma-logging.	
TOTAL DEPTH = 7.0 FT.									PVC casing was removed after logging and hole was grouted to -4' below surface and remaining hole was backfilled with drilling spoils.		
* Core recovery refers to total soil & rock sample.											
Ground elevation estimated from site topographic map.											
Description & classification by visual examination of sample.											
Colors from "Rock-Color Chart" (GSA, 1948).											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		National Community Bank		Last Update: 03-19-92	HOLE NO. R531		



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. I OF I	HOLE NO. R532
SITE National Community Bank		COORDINATES N 7747.0; E 11013.0			ANGLE FROM HORIZ BEARING Vertical	
BEGUN 10-9-90	COMPLETED 10-9-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Crane and hammer	SIZE 8"	OVERBURDEN 8.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./X) 5.8/73*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 47.5	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.6	2 8 10				47.5 47.0 46.2 46.0 45.9 45.5 45.1 44.5 44.3 43.5		(Template: MYMD) 0.0 - 0.5 ft: TOPSOIL, (ML); Grayish black (N2), with fine roots present, soft, moist. 0.5 - 1.3 ft: Gravally SILT, (ML); Grayish red (10R4/2) to Blackish red (5R2/2), increased gravel with depth, moderately firm, moist. 1.3 - 1.5 ft: CLAY, (CL); Olive black (5Y2/1), plastic, very firm, moist. 1.5 - 2.4 ft: Sandy SILT, (ML); Grayish black (N2), increased gravel between 2.0 - 2.4', soft changing with depth to firm, moist. 2.4 - 3.0 ft: Gravally, Sandy SILT, (ML); Moderate reddish brown (10R4/6), gravel is sandstone, firm, moist. 3.0 - 5.1 ft: Sandy GRAVEL, (GW); Dark Gray (N3), with minor silt, loose, moist. 5.1 - 6.4 ft: Clayey SILT, (ML); Grayish black (N2), fine roots present, slightly plastic, firm, moist. 6.4 - 7.3 ft: Silty CLAY, (CL); Grayish green (10GY5/2), root channels present throughout, plastic, very firm, moist. 7.3 - 7.6 ft: SAND, (SP); Light olive gray (5Y5/2), medium grained, moderately well sorted, minor silt, firm, moist. TOTAL DEPTH = 8.0 FT.	Complete borehole number is B3890R532. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was grouted to -4' below surface and remaining hole was backfilled with drilling spoils.	
SS	2.0	1.2	14 19 17 12				42.4 42.1 41.5 41.1				
SS	2.0	1.4	9 7 5 5				40.2 39.9 39.5				
SS	2.0	1.6	2 3 15 29								

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE National Community Bank	Last Update: 03-19-92	HOLE NO. R532
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
National Community Bank				FUSRAP		14501	1 OF 1	R535					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
National Community Bank			N 7735.0; E 10875.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
10-11-90	10-11-90	Hydro Group, Inc.	Tripod		3.5"	8.0	0.0	8.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
6.1/76*		0	4	NA	47.5	- 6.5 ATD / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:									
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>									
(Template: MYWD)													
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	WATER PRESSURE			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.4	2 5 9 11					47.5				0.0 - 0.4 ft: TOPSOIL; Grayish black (N2), with roots, moist.	Complete borehole number is B3890R535.
SS	2.0	1.3	5 9 9 5					46.1 45.5				0.4 - 2.9 ft: Gravelly Sandy SILT, (ML); Grayish red (5R4/2) to Dark reddish brown (10R3/4); gravel up to 0.1', sandstone; firm, moist (Fill?).		Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	1 3 2 1					44.6 44.2 43.5				2.9 - 3.3 ft: Silty SAND, (SM); Dusky brown (5YR2/2) changing to Moderate brown (5YR3/4) at 3.1'; sand is very coarse, poorly sorted, loose, with coal fragments between 2.9 - 3.1' and fine, well sorted, firm, below 3.1' moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.6	17 23 32 37					42.4 42.1 41.7 41.5 41.2 40.9	5			4.0 - 5.1 ft: Graded Material; Black (N1), fine sand grading with depth to gravel size, larger pieces are vesicular with rust stains (reworked slag?), broken glass present in lower zones, loose, slightly moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
								39.9 39.5				5.1 - 5.4 ft: SAND, (SP); Moderate brown (5YR3/4), fine grained, moderately well sorted, firm, moist.		3" PVC casing inserted to 6.0' for gamma-logging.
												5.4 - 6.3 ft: Sandy SILT, (ML); Grayish red (5R4/2) to Blackish red (5R2/2) changing to Grayish brown (5YR3/2) at 6.0, with roots; firm and moist to soft and wet below 5.4'.	Casing broke after logging and could not be removed from hole.
												6.3 - 6.6 ft: Silty SAND, (SM); Dusky yellowish green (5GY5/2), sand is fine grained, firm, moist.	Hole was grouted to -1' below surface and remaining hole was backfilled with drilling spoils.
												6.6 - 7.6 ft: SAND, (SP); Moderate brown (5YR3/4), fine to medium grained, moderately well sorted, firm, moist.	
TOTAL DEPTH = 8.0 FT.													

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R535
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R572
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 7903.0; E 10755.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-8-90	10-8-90	Hydro Group, Inc.	Mobile B-80	8"	8.0	0.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
6.1/76*		0	4	NA	46.5	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Robert Cook					

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
								48.5				(Template: MYWD)	
								48.3				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R572.
SS	1.5	1.3		7 14 11				44.7 44.5				0.5 - 1.5 ft: FILL. 0.5 - 1.5 ft: Clayey Silt; Dusky yellowish brown (10R2/2), silt -60%, clay -30%, gravel -10%, no plasticity, loose, moist.	Note: hole was originally numbered B3890R519-1.
SS	2.0	1.2		18 10 4 6				43.3				1.5 - 1.6 ft: Sand; Pale yellowish brown (10YR6/2), fine grained, no plasticity, loose, moist.	Augered through asphalt to 0.5'.
								42.5 42.2				1.6 - 4.3 ft: Clayey Silt; Dark reddish brown (10R3/4), silt -60%, clay -30%; cement fragments -15%; no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6		1 3 10 12				41.5	5			4.3 - 5.0 ft: Silty CLAY, (CL); Brownish black (5YR2/1), very fine grained, minor wood fragments, low plasticity, moist.	Augered to 4.0'.
								40.9 40.5				5.0 - 6.9 ft: SAND, (SP); Light olive gray (5Y6/1), mottled; fine to medium grained, rounded to subangular grains, well sorted, moderately dense, moist.	Augered to 6.0'.
SS	2.0	2.0		9 9 11 22				39.6				6.9 - 8.0 ft: Clayey SILT, (ML); Pale yellowish brown (10YR6/2), mottled with Grayish orange (10YR7/4), very fine to fine grained, bedding present, low plasticity, very stiff, moist.	Augered to total depth of 8.0'.
								38.5				TOTAL DEPTH = 8.0 FT.	3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R572
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R577
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 8025.0; E 10950.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-17-90	11-17-90	Hydro Group, Inc.	Soil Sentry	8"	10.0	0.0	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
4.4/44*		0	5	NA	47.0	NA / none ATD	NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in			none			Stephen Knuttel				

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
							47.0				(Template: NYWD)	
SS	1.8	0.9	12/4" 19 19 28				46.8				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R577. Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 8.0'. Augered to total depth of 10.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	0.6	23 19 19 24				45.9				0.2 - 1.1 ft: FILL; Disturbed soils, Sandy Silt, Dark reddish brown (10R3/4); Silty Clay, Grayish black (N2); and Sandy Clay, Greenish gray (5G6/1).	
SS	2.0	1.1	5 5 10 12				45.0				2.0 - 4.6 ft: Sandy, Clayey SILT, (ML); Grayish black (N2), subrounded pebbles up to -2 cm common between 2.0 - 2.6' and sparsely scattered between 4.0 - 4.6', moderately firm, moist.	
SS	2.0	1.0	9 28 30 35				44.4				4.6 - 6.2 ft: Sandy CLAY, (CL); Grayish green (10GY5/2), clay content decreases with depth, moderately plastic, firm, moist.	
SS	2.0	0.8	15 17 26 42				43.0				6.2 - 7.0 ft: Silty SAND, (SM); Grayish red (5R4/2), silt to medium sand, poorly sorted, with subrounded sandstone gravel, firm, moist.	
							42.4				8.0 - 8.8 ft: SAND, (SP); Moderate brown (5YR4/4) to Pale brown (5YR5/2), very fine grained, moderately well sorted, firm, wet.	
							41.9	5				
							41.0					
							40.8					
							40.0					
							39.0					
							38.2					
							37.0	10			TOTAL DEPTH = 10.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R577
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R578	
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING		
National Community Bank			N 8050.0; E 10970.0			Vertical			-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-17-90	11-17-90	Hydro Group, Inc.	Mobile B-80	8"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.5/81*		0	4	NA	47.0	V / none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in		none		Robert Cook							

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRES. P.S.I.	TIME MIN.						
							47.0				(Template: MYWD)	
SS	1.5	1.3	10 15 17				46.8 46.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R578.
SS	2.0	1.8	11 12 16				45.2 45.0				0.5 - 3.6 ft: Sandy SILT, (ML); Moderate brown (5YRS/4) changing to Dusky yellowish brown (10YR2/2) at 2.3', silt -60%, sand -40%, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.9	1.9	16 31 49 50/4"				43.4 43.2 43.0				3.6 - 5.2 ft: Silty SAND, (SM); Olive gray (5Y4/1) changing to dusky brown (5YR2/2) at 4.3', sand -70%, silt -30%.	Augered to 4.0'.
SS	1.5	1.5	10 48 50/6"				41.8 41.1 41.0	5			5.2 - 7.5 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6) changing to Moderate brown (5YRS/4) at 6.0' and to Dark reddish brown (10R3/4) at 6.5'.	Spoon refusal at 5.9'. Augered to 6.0'.
							39.5 39.0				TOTAL DEPTH = 8.0 FT.	Spoon refusal at 7.5'. Augered to total depth of 8.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R578
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R579
SITE National Community Bank			COORDINATES N 8025.0; E 10960.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 11-18-90	COMPLETED 11-18-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Soil Sentry	SIZE 8"	OVERBURDEN 7.6	ROCK (FT.) 0.0	TOTAL DEPTH 7.6
CORE RECOVERY (FT./%) 4.9/64*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 47.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
SS	1.8	1.3	17/4"				47.0			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R579. Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Spoon refusal at 7.6'. Augered to total depth of 7.6'. 3' PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			19				46.8			0.2 - 1.3 ft: FILL; Sandy Silt and Silty Clay; Grayish black (N2), with debris, moist.	
			21				45.7				
			30				45.5			1.3 - 2.8 ft: Sandy, Silty CLAY, (CL); Grayish black (N2), moist.	
SS	2.0	1.2	16				45.0			2.8 - 4.5 ft: Clayey, Sandy SILT, (ML); Grayish black (N2), minor roots and organic material; minor gravel between 4.0 - 4.5'; moderately firm, moist.	
			16				44.2				
			14				43.8				
			19				43.0				
SS	2.0	1.4	6				43.0			4.5 - 4.9 ft: Clayey SAND, (SC); Olive gray (5Y4/1), sand is fine grained, moderately sorted, firm, moist.	
			11				42.5				
			19				42.1				
			31				41.6	5		4.9 - 5.4 ft: Silty SAND, (SM); Grayish red (5R4/2), sand is fine to medium grained, poorly sorted, minor pebbles of mixed composition, firm, moist.	
SS	1.6	1.0	11				41.0			6.0 - 7.0 ft: Gravelly, Silty SAND (SM); Dark reddish brown (10R3/4), sand is fine to medium grained; gravel is sandstone, subrounded to subangular; moderately sorted, firm, moist.	
			19				40.0				
			27				39.4				
			50/1"								

TOTAL DEPTH = 7.6 FT.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE National Community Bank	Last Update: 03-19-92	HOLE NO. R579
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
				FUSRAP		14501	1 OF 1	R580					
SITE			COORDINATES			ANGLE FROM HORIZ/BEARING							
National Community Bank			N 8030.0; E 10920.0			Vertical -----							
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-18-90	11-18-90	Hydro Group, Inc.	Mobile B-80		8"	8.0	0.0	8.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
7.0/88*		0	4	NA	47.5	V / none ATD NA / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE CORE BLOWS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
										TIME MIN.			
						47.5					0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R580.	
SS	1.5	1.1	11 14 13			47.8					0.5 - 4.7 ft: Clayey SILT (ML); Pale brown (5YR5/2) changing to Dusky yellowish brown (10YR2/2) at 2.7'; with trace of silt, Greenish gray (5G6/1), between 4.6 - 4.7'; silt -70%, clay -20%, sand -10%; minor roots present between 2.0 - 3.9'; no plasticity, moist.		Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
						45.9						Augered to 4.0'.	
SS	2.0	1.9	13 12 11 26			45.5							
						43.6						Augered to 6.0'.	
SS	2.0	2.0	18 16 15 21			43.5							
						42.8						Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging.	
						42.1							
						41.6						PVC casing was removed after logging and hole was backfilled with drilling spoils.	
SS	2.0	2.0	21 20 26 25			39.5							
										TOTAL DEPTH = 8.0 FT.			
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>													
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER				SITE				National Community Bank		Last Update: 03-19-92		HOLE NO. R580	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
National Community Bank				FUSRAP		14501	1 OF 1	R581			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
National Community Bank			N 7980.0; E 10950.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-18-90	11-18-90	Hydro Group, Inc.	Soil Sentry		8"	10.0	0.0	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.9/69*		0	5	NA	47.0	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	1.8	1.1	20/4" 10 20 23				47.0 46.8 45.7 45.0 44.1 43.0 41.6 41.0 40.6 39.7 39.4 39.1 39.0 37.4 37.0	5 10	<p>(Template: MYWD)</p> <p>0.0 - 0.2 ft: ASPHALT</p> <p>0.2 - 2.9 ft: Silty SAND, (SM); Grayish brown (5YR3/2), sand is fine to medium grained, moderately sorted, firm, moist.</p> <p>4.0 - 6.4 ft: Silty, Clayey SAND, (SC); Brownish black (5YR2/1) to Grayish black (N2), with minor pebbles and glassy slag fragments, Black (N1); sand is fine to medium grained, poorly sorted, minor organic material present, firm, moist.</p> <p>6.4 - 7.3 ft: Sandy CLAY, (CL); Dusky yellowish green (5GY5/2), moderately plastic, firm, moist.</p> <p>7.3 - 7.6 ft: SAND, (SW); Pale brown (5YR5/2), fine to medium grained, moderately sorted, minor silt and clay, firm, moist.</p> <p>7.6 - 7.9 ft: Sandy CLAY, (CL); Dusky yellowish green (5GY5/2), moderately plastic, firm, moist.</p> <p>8.0 - 9.6 ft: Interlayered SAND and Silty SAND, (SP-SM); Grayish brown (5YR3/2) to Moderate brown (5YR3/4); layers of fine and medium sand are 0.2 - 0.4' thick, moderately well sorted within the layers; minor silt and clay, moderately firm, wet; layer of Silt, Moderate brown (5YR4/4) between 9.4 - 9.5'.</p> <p>TOTAL DEPTH = 10.0 FT.</p>	<p>Complete borehole number is B3890R581.</p> <p>Augered through asphalt to 0.2'.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Augered to 8.0'.</p> <p>Augered to total depth of 10.0'.</p> <p>3" PVC casing inserted to 9.5' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with drilling spoils.</p>	
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE			National Community Bank		Last Update: 03-19-92	HOLE NO. R581	



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R582
SITE National Community Bank		COORDINATES N 8045.0; E 10938.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 11-18-90	COMPLETED 11-18-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 8.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 6.4/80*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 47.5	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook	

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
							47.5			(Template: MYWD)	
SS	1.5	1.1	8 0 19				47.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R582.
							46.1			0.5 - 1.4 ft: Clayey SILT, (ML); Moderate brown (5YR3/4), no plasticity, moist.	
SS	2.0	1.5	9 31 26 15				45.9			1.4 - 2.2 ft: SILT, (ML); Greenish gray (5G6/1) changing to Moderate brown (5YR3/4) at 2.0', silt -90%, sand -10%, no plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							45.5			2.2 - 2.6 ft: Clayey SILT, (ML); Moderate reddish brown (10R4/6), silt -80%, clay -20%, no plasticity, moist.	
SS	2.0	1.8	5 7 16 29				44.9			2.6 - 5.3 ft: Sandy SILT, (ML); Grayish brown (5YR3/4), silt -80%, fine to medium sand -20%; changing to Dark reddish brown (10R3/4) at 4.5'; and to Dusky yellowish brown (10YR2/2), silt -60%, very fine to fine sand -20%, clay -10, at 4.7'; no plasticity, moist.	Augered to 4.0'. Augered to 6.0'.
							44.0			5.3 - 5.5 ft: Silty CLAY, (CL); Olive gray (5Y4/1), no plasticity, moist.	
SS	2.0	2.0	30 31 40 42				43.5			5.5 - 7.8 ft: Sandy SILT, (ML); Moderate brown (5YR3/4), silt -80%, very fine to fine sand -20%; changing to Moderate reddish brown (10R4/6), fine to medium sand, no plasticity, at 6.4'; moist.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
							42.2			7.8 - 8.0 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), sand is fine to very coarse grained -60%, silt -40%, no plasticity, wet.	
							42.0				
							41.7				
							41.5				
							39.7				
							39.5				
TOTAL DEPTH = 8.0 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE National Community Bank	Last Update: 03-19-92	HOLE NO. R582
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R583

SITE

National Community Bank

COORDINATES

N 7970.0; E 11000.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

11-18-90

COMPLETED

11-18-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

5.0

ROCK (FT.)

0.0

TOTAL DEPTH

5.0

CORE RECOVERY (FT./%)

2.2/44*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

47.0

DEPTH/EL. GROUND WATER

none ATD / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS	G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.8	1.3	23/4"				47.0					
			20				46.8				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R583. Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Spoon refusal at 4.1'. Augered to 5.0'; encountered stormwater drainpipe; drilling stopped. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with grout and drilling spoils.
			20				45.5				0.2 - 2.9 ft: FILL; mixed fill, primarily Silty Sand, Grayish brown (5YRS/2) to Moderate brown (5YRS/4), firm, slightly moist.	
SS	2.0	0.9	19				45.0					
			24				44.1					
SS	0.1	0.0	50/1"				42.0				TOTAL DEPTH = 5.0 FT.	

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE

National Community Bank

Last Update: 03-19-92

HOLE NO. R583



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
National Community Bank				FUSRAP		14501	1 OF 1	R584					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
National Community Bank			N 8077.0; E 10985.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-18-90	11-18-90	Hydro Group, Inc.		Mobile B-80		8"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
5.5/69*		0	4	NA	47.0	/ none ATD / NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Robert Cook								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS	% CORE RECOVERY	WATER PRESSURE			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
								47.0					
SS	1.5	1.1		7 10 19				46.8 46.5				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R584.
SS	2.0	1.1		9 13 14 18				45.8 45.4 45.0				0.5 - 1.2 ft: FILL; Gravelly, Sandy Silt; Moderate brown (5YR3/4), gravel -10%, slag -5%, moist.	Augered through asphalt to 0.5'.
SS	2.0	1.6		4 7 12 13				44.3 43.9				1.2 - 2.7 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), silt -60%, sand -40%, no plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7		18 13 14 17				43.0				2.7 - 5.3 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Brownish black (5YR2/1) at 4.2'; silt -60-70%, clay -30-40%, low plasticity, moist.	Augered to 4.0'.
								41.7 41.4 41.0	5			5.3 - 5.6 ft: Silty CLAY, (CL); Greenish gray (5G6/1), clay -80%, silt -20%, medium plasticity, moist.	Augered to 6.0'.
								39.3 30.0				6.0 - 7.7 ft: Clayey SILT, (ML); Moderate reddish brown (10R4/6), silt -70%, clay -20, sand -10%, no plasticity, moist.	
											TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'.	
												3" PVC casing inserted to 7.5' for gamma-logging.	
												PVC casing was removed after logging and hole was backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				National Community Bank		Last Update: 03-19-92		HOLE NO. R584	



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R585
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 7950.0; E 11025.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-18-90	11-18-90	Hydro Group, Inc.	Soil Sentry		8"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.2/65*		0	4	NA	47.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Stephen Knuttel						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.8	1.3	12/4" 16 23 24				47.0 46.8				0.0 - 0.2 ft: ASPHALT. 0.2 - 1.3 ft: Silty SAND, (SM); Grayish Brown (5YR3/2), mixed soils with clay and gravel, disturbed, firm, moist.	Complete borehole number is B3890R585.
SS	2.0	1.2	20 18 16 16				45.7 45.5 45.0 44.8				1.3 - 2.2 ft: Silty SAND, (SM); Grayish black (N2), sand is fine grained, moderately sorted, firm, moist. 2.2 - 5.2 ft: SAND, (SP); Pale brown (5YR5/2), fine grained, moderately well sorted, slightly layered, firm, moist.	Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	3 3 8 20				43.8 43.0					Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.3	16 23 28 40				41.8 41.8 41.0 40.1 39.7 39.0	5			5.2 - 5.4 ft: SAND, (SW); Dark yellowish brown (10YR4/2), medium grained, moderately sorted, little fines, loose, wet. 6.0 - 6.9 ft: SAND, (SW); Moderate brown (5YR4/4), fine to medium grained, moderately sorted, moderately firm, wet. 6.9 - 7.3 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted, minor sandstone gravel, firm, moist.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
											TOTAL DEPTH = 8.0 FT.	

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R585
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R586
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
National Community Bank			N 8040.0; E 11035.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-18-90	11-18-90	Hydro Group, Inc.	Mobile B-80		8"	10.0	0.0	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
6.7/67*		0	5	NA	46.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
							46.0				(Template: MYWD)	
SS	1.5	1.1	6 7 7				43.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R586.
							44.4				0.5 - 2.6 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2), silt -60%, sand -30%, clay -10%, no plasticity, moist.	
SS	2.0	1.6	4 4 5 8				44.0				2.6 - 3.3 ft: Clayey SAND, (SC); Dusky yellowish brown (10YR2/2), sand is fine to medium grained -50%, clay -30%, silt -20%, low plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
							43.4				3.3 - 4.5 ft: Silty CLAY, (CL); Greenish gray (5GY6/1) changing to Olive black (5Y2/1) at 4.0', clay -60-70%, silt -30-40%, medium plasticity, moist.	
SS	2.0	1.8	5 7 6 3				41.5	5			4.5 - 6.9 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2) changing to Grayish red (10R4/2) at 5.5' and to Moderate reddish brown (10R4/6) at 6.0', silt -60-70%, sand is fine to medium grained -30-40%, no plasticity, moist.	Augered to 4.0'. Augered to 6.0'.
							40.2				6.9 - 7.3 ft: Clayey SILT, (ML); Olive black (5Y2/1), firm, moist.	
SS	2.0	1.3	3 2 2 3				40.0				8.0 - 8.9 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), silt -60%, sand -40%, minor sandstone cobbles present, no plasticity, moist.	Augered to 8.0'. Augered to total depth of 10.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
							39.1				TOTAL DEPTH = 10.0 FT.	
							38.7					
							38.0					
							37.1					
							36.0	10				

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R586
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
National Community Bank				FUSRAP		14501	1 OF 1	R624				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
National Community Bank			N 7735.0; E 10969.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
1-8-91	1-8-91	Hydro Group, Inc.		Tripod		3.5"	12.0	0.0	12.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
5.9/49*		0	6	NA	58.0	7' ATD NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOCKS CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	2 3 12				58.0				0.0 - 4.6 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6) to Dusky brown (5YR2/2), sand is fine to medium grained, moderately sorted, firm, moist.	Complete borehole number is B3890R624.
SS	2.0	0.8	4 4 5				56.7 56.0 55.2					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	3 3 4				54.0 53.4 52.7	5			4.6 - 5.3 ft: Clayey SAND, (SC); Olive black (5Y2/1) to Blackish red (5R2/2), sand is fine to medium grained, poorly sorted; 0.2' pebble, reworked? slag, hard, between 4.8 - 5.0'; firm, moist.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	0.5	2 2 3				52.0 51.5				6.0 - 6.5 ft: SAND and Clayey SILT, (SM & ML); mixed interval, disturbed; sand is Moderate brown (5YR4/4), fine; silt is Olive black (5Y2/1).	
SS	2.0	0.8	3 5 27 27				50.0 49.7 49.2				8.0 - 8.3 ft: Silty CLAY, (CL); Olive black (5Y2/1), moderately plastic, firm, moist.	
SS	2.0	1.2	9 12 27 24				48.0 47.1 46.8 46.0	10			8.3 - 10.9 ft: SAND, (SW); Grayish black (N2), fine to coarse grained, poorly sorted; changing to Moderate brown (5YR4/4) to Grayish brown (5YR3/2), fine to medium grained, moderately sorted, at 10.0'; clean, firm, moist to wet.	Borehole enlarged by driving 3.5" OD split spoon to depth.
											10.9 - 11.2 ft: SILT, (ML); Light brown (5YR5/6), little plasticity, very firm, moist.	3" PVC casing inserted to 10.5' for gamma-logging.
TOTAL DEPTH = 12.0 FT.											PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE National Community Bank

Last Update: 03-19-92

HOLE NO. R624



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R625
SITE National Community Bank		COORDINATES N 7726.0; E 10953.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 1-8-91	COMPLETED 1-8-91	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Tripod	SIZE 3.5"	OVERBURDEN 10.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 6.0/60*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 46.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	2.0	1.7	5 19 22 26				46.0				(Template: MYWD)	
SS	2.0	1.1	11 12 19 27				44.3 44.0				0.0 - 0.5 ft: TOPSOIL, (SM); Grayish black (N2). Silty SAND, with roots, loose, moist. 0.5 - 3.1 ft: Gravelly, Silty SAND, (SM); Blackish red (5R2/2) to Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, sandstone gravel, minor debris, firm, moist; sedimentary clasts composed of Clayey Silt, Greenish gray (5GY6/1) common below 2.0'.	Complete borehole number is B3890R625. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	0.8	9 15 24 25				42.0	5			4.0 - 4.8 ft: Clayey, Silty SAND, (SM); Olive black (5Y2/1) mottled with Dark reddish brown (10R3/4) and Blackish red (5R2/2), sand is fine to medium grained, poorly sorted, firm, moist.	
SS	2.0	0.8	4 12 17 19				40.0				6.0 - 9.1 ft: SAND, (SW); Grayish red (10R4/2) with minor Grayish green (10GY5/2) between 6.0 - 6.3', fine grained, moderately sorted; changing to Moderate brown (5YR4/4), fine to medium grained, poorly sorted, dirty, minor angular sandstone gravel, at 8.0'; firm, moist.	
SS	2.0	1.6	9 15 15 27				38.0				9.1 - 9.4 ft: SILT, (ML); Light brown (5YR5/6), little plasticity, very firm, moist. 9.4 - 9.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4), sand is fine grained, moderately sorted, dirty, firm, moist.	Borehole enlarged by driving 3.5" OD split spoon to depth.
							36.9 36.6 36.4 36.0	10			TOTAL DEPTH = 10.0 FT.	3" PVC casing inserted to 9.0' for gamma-logging. PVC casing was removed after logging and hole was grouted to -5' below surface and remaining hole backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
National Community Bank

Last Update:
03-19-92 HOLE NO.
R625



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R629
SITE National Community Bank		COORDINATES N 8027.0; E 10935.0			ANGLE FROM HORIZ BEARING Vertical	
BEGUN 1-11-91	COMPLETED 1-11-91	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Soil Sentry	SIZE 8"	OVERBURDEN 10.0	ROCK (FT.) 0.0
CORE RECOVERY (FT./%) 4.6/46*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 47.0	DEPTH/EL. GROUND WATER NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
							47.0				
SS	1.5	0.8	10				46.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R629.
			15				45.7			0.5 - 1.3 ft: Gravelly SAND, (SW); Moderate reddish brown (10R4/6), sand is fine to medium grained, poorly sorted, gravel as above, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.9	10				45.0			2.0 - 2.9 ft: Sandy SILT, (ML); Grayish black (N2), minor gravel present, with root material, slightly plastic, firm, moist.	Augered through asphalt to 0.5'.
			23				44.1				Augered to 4.0'.
			18				43.0				
SS	2.0	1.3	3				42.0	5		4.0 - 5.0 ft: Sandy, Clayey SILT, (ML); Grayish black (N2) mottled with minor Dark reddish brown (10R3/4), minor subrounded to subangular fine sandstone pebbles and coal fragments, moderately plastic, firm, moist.	
			8				41.7				
			14				41.0				
SS	2.0	1.3	13				39.7			5.0 - 5.3 ft: Clayey SAND, (SC); Grayish red (5R4/2) mottled with Grayish olive (10Y4/2), sand is fine grained, moderately sorted, minor roots and pebbles, firm, moist.	Augered to 6.0'.
			36				39.0				
			36				38.7			6.0 - 7.3 ft: Interlayered SILT and Silty SAND, (SM-ML); Grayish red (5R4/2 - 10R4/2); silts are very firm; sands are very fine grained, well sorted; minor fine pebbles of mixed composition; firm, moist.	Augered to 8.0'.
SS	0.9	0.3	27				37.0	10		8.0 - 8.3 ft: Sandy GRAVEL, (GW); Dark reddish brown (10R3/4); gravel is sandstone, angular; sand is fine to medium grained, moderately sorted; firm, moist.	Spoon refusal at 8.9'.
			50/5"								Augered to total depth of 10.0'.
										TOTAL DEPTH = 10.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE National Community Bank	Last Update: 03-19-92	HOLE NO. R629
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	C630
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 8080.0; E 11010.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-14-91	1-14-91	Hydro Group, Inc.	Soil Sentry		8"	8.0	3.0	11.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.5/50*		0	6	NA	46.5	7' ATD / NA		8.0/38.5		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLONS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS ON G.P.M.	PRESS. P.S.I.	TIME MIN.					
							46.5				
SS	1.5	1.0	5 6				48.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890C630.
SS	2.0	1.1	8 2 7 7				45.0			0.5 - 5.0 ft: FILL; Silty Sand; Moderate reddish brown (10R4/6); minor coal slag, Black (N1), between 2.0 - 5.0'; sand is fine grained, moderately sorted, firm, moist.	
SS	2.0	1.3	2 2 5 27				44.5				Augered through asphalt to 0.5'.
SS	2.0	1.3	2 2 5 27				43.4				Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	2 2 5 27				42.5				Augered to 4.0'.
SS	2.0	0.8	2 6 6 7				41.5	5		5.0 - 6.8 ft: Gravelly SAND, (SW); Black (N1), sand is fine grained, moderately sorted; piece of wood present with little fines between 5.0 - 5.3'; increased fines below, moderately firm to loose, wet (Fill?).	Augered to 6.0'.
SS	2.0	0.8	2 6 6 7				41.2				
SS	0.4	0.4	50/5*				40.5				
SS	2.0	0.9	44 46 18 20				39.7			8.0 - 9.9 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, gravel is sandstone, firm, moist.	Augered to 8.0'. Spoon refusal at 8.4'. Augered to 9.0'.
							38.5				
							38.1				
							37.5				
							36.6	10			
							35.5				
TOTAL DEPTH = 11.0 FT.										Augered to total depth of 11.0'.	
										3" PVC casing inserted to total depth for gamma-logging.	
										PVC casing was removed after logging and hole was backfilled with drilling spoils.	
										* Core recovery refers to total soil & rock sample.	
										Ground elevation estimated from site topographic map.	
										Description & classification by visual examination of sample.	
										Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. C630
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R631
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 7722.0; E 10942.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-14-91	1-14-91	Hydro Group, Inc.	Tripod		3.5"	8.9	0.0	8.9		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.0/45*		0	5	NA	46.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.2	1 6 7 6			46.0				0.0 - 0.5 ft: TOPSOIL, Grayish black (N2), silt and fine grained sand with root material.	Complete borehole number is B3890R631. Borehole sampled and gamma-logged by TMA/Eberline Corp. Hole advanced to depth by 3" OD split spoon samplers. Spoon refusal at 8.9'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 8.4' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	0.2	1 3 3 4			44.0 43.8				0.5 - 2.2 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), sand is fine to medium grained, poorly sorted, minor sandstone gravel, firm, moist; layer of Sandy Gravel, Black (N1), between 1.1 - 1.2'.	
SS	2.0	0.9	6 7 23 33			42.0 41.8 41.1	5			4.0 - 4.2 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), gravel is sandstone. 4.2 - 7.5 ft: SAND, (SW); Moderate brown (5YR4/4), sand is fine grained, moderately sorted; clayey between 4.2 - 4.4'; clean between 4.4 - 4.9' and minor silt, dirty, between 6.9 - 7.3'; moderately firm, moist.	
SS	2.0	1.5	6 23 30 35			40.0					
SS	0.9	0.2	36 50/4"			38.5 38.0 37.8 37.1				8.0 - 8.2 ft: SILT, (ML); Moderate brown (5YR4/4) to Light brown (5YR5/6), firm, moist.	
TOTAL DEPTH = 8.9 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R631
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
National Community Bank				FUSRAP		14501	1 OF 1	R632		
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
National Community Bank			N 8000.0; E 10950.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-15-91	1-15-91	Hydro Group, Inc.	Soil Sentry		8"	8.0	0.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.6/70*		0	4	NA	47.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Stephen Knuttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. LOSS IN G.P.M	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
									DESCRIPTION AND CLASSIFICATION	
SS	1.5	0.8	15 25 25		47.0 46.8 45.7				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R632.
SS	2.0	1.2	14 25 20 17		45.0 43.8				2.0 - 3.2 ft: Gravelly SAND, (SW); Dusky brown (5YR2/2), sand is fine grained, moderately sorted, gravel is of mixed compositions, with debris and wood fragments, firm, moist (Fill?).	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.8	15 17 20 25		43.0				4.0 - 5.6 ft: Interlayered Clayey SAND and Silty SAND, (SC-SM); Moderate brown (5YR3/4) to Grayish brown (5YR3/2), sand is fine grained, moderately sorted, dirty; minor debris (reworked?) present between 4.0 - 4.5'; firm, moist.	Augered to 4.0'.
SS	2.0	1.8	26 31 30 32		41.4 41.2 41.0	5			5.6 - 5.8 ft: Clayey SAND, (SC); Greenish gray (5GY6/1), sand is fine grained, moderately well sorted, moderately plastic, very firm, moist.	Augered to 6.0'.
					39.8 39.4 39.2 39.0				6.0 - 7.2 ft: Interlayered Silty SAND and SAND, (SM-SP); Moderate brown (5YR4/4), sand is very fine to fine grained, well sorted, clean; silty layers are moderately sorted; firm, moist.	Augered to total depth of 8.0'.
									7.2 - 7.6 ft: Sandy SILT, (ML); Light brown (5YR5/6), firm, moist.	3" PVC casing inserted to total depth for gamma-logging.
									7.6 - 7.8 ft: SAND, (SP); Moderate brown (5YR4/4), medium grained, moderately well sorted, loose, wet.	PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 8.0 FT.										
SS = SPLIT SPOON; NQ = CORE BARREL; SITE									National Community Bank	
HX = HAND AUGER; O = OTHER									Last Update: 05-19-92	
									HOLE NO. R632	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.							
National Community Bank				FUSRAP		14501	1 OF 1	R633							
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING							
National Community Bank			N 7905.0; E 10985.0			Vertical		-----							
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH						
1-15-91	1-15-91	Hydro Group, Inc.		Soil Sentry		8"	11.0	0.0	11.0						
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK							
5.7/52*		0	6	NA	49.5	/ none ATD / NA		NA/NA							
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:										
140 lbs/30 in		none			Stephen Knuttel										
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REL.	SAMPLE BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
						PRESS. P.S.I.	TIME MIN.								
								49.5				(Template: MYWD)			
SS	1.5	0.9	5	6				49.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R633.		
SS	2.0	1.4	7	9				48.1				0.5 - 3.4 ft: Silty SAND, (SM); Grayish brown (5YR3/2) with minor Moderate reddish brown (10R4/8) and minor coal slag, Black (N1); sand is fine to coarse grained, poorly sorted; increased gravel of mixed compositions between 2.0 - 3.4'; firm, moist (Fill?).	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.		
SS	2.0	1.4	7	9				47.5				4.0 - 4.2 ft: Silty SAND, (SM); Grayish black (N2), sand is fine, minor clay, moist.	Augered to 4.0'. Spoon refusal at 4.4'. Augered to 5.0'.		
SS	0.4	0.3	50/5*					46.1				4.2 - 4.3 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), Gravel is sandstone.			
SS	2.0	1.5	9	11				45.5				5.0 - 5.9 ft: Gravelly SAND, (SW); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, firm, moist.	Augered to 7.0'.		
SS	2.0	0.4	18	8				45.3				5.9 - 6.5 ft: Silty SAND, (SM); Grayish brown (5YR3/2), sand is fine to coarse grained, poorly sorted, dirty; subrounded pebbles common; sludge fragment, -1 cm, White (N9), present (reworked?); firm, moist.			
SS	2.0	0.4	6	10				44.5	5			7.0 - 7.3 ft: SAND, (SW); Moderate brown (5YR3/4), coarse grained, moderately sorted, clean, loose, moist.	Augered to 9.0'.		
SS	2.0	1.2	3	5				43.6				7.3 - 7.4 ft: Sandy SILT, (ML); Black (N1), minor fine roots, firm, moist.			
			15	17				42.5				9.0 - 10.2 ft: Interlayered Clayey SAND and SAND, (SC-SP); Grayish green (10GY6/2); clayey sands are fine grained, well sorted, dirty, moderately plastic, firm, moist; sands are fine to medium grained, well sorted, clean, loose to moderately firm, wet.	Augered to total depth of 11.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was grouted to -7' below surface and remaining hole backfilled with drilling spoils.		
								42.2							
								42.1							
								40.5							
								40.0							
								39.3	10						
								38.5							
TOTAL DEPTH = 11.0 FT.															
* Core recovery refers to total soil & rock sample.															
Ground elevation estimated from site topographic map.															
Description & classification by visual examination of sample.															
Colors from "Rock-Color Chart" (GSA, 1948).															
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER						SITE			National Community Bank			Last Update: 03-19-92		HOLE NO. R633	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 1	R634			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
National Community Bank			N 7910.0; E 10975.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
1-16-91	1-16-91	Hydro Group, Inc.		Soil Sentry		8"	12.0	0.0	12.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
7.7/64*		0	6	NA	49.5	V / none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knuttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLONS - CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M	PRESS. P.S.I.	TIME MIN.					
						49.5					
SS	1.5	0.9	5 6 8			49.4 49.0 48.1			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R634.	
SS	2.0	1.5	7 9 10 11			47.5			0.5 - 3.5 ft: Sandy GRAVEL, (GW); Moderate brown (5YR4/4 - 3/4); clay clast between 1.2 - 1.4'; sand is fine to medium grained, moderately sorted, moderately firm, moist.	Augered through asphalt to 0.5' Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.2	19 30 46 45			46.0 45.5			4.0 - 7.3 ft: Gravelly SAND, (SW); Moderate reddish brown (10R4/6) changing to Moderate brown (5YR3/4) at 6.0', gravel is mix composition, primarily granitic between 6.0 - 7.2'; sand is fine to medium grained, moderately sorted, firm, moist.	Augered to 4.0'.	
SS	2.0	1.3	30 36 26 5			44.3 43.5	5			Augered to 6.0'.	
SS	2.0	1.3	2 6 9 15			42.2 41.5 41.4 41.1			8.0 - 8.1 ft: SILT, (ML); Black (N1), minor clay, firm, moist.	Augered to 8.0'.	
SS	2.0	1.5	nr			40.2 39.5	10		8.1 - 8.4 ft: Clayey SAND, (SC); Grayish green (10GY6/2), sand is fine grained, moderately sorted, dirty, clay content decreases with depth, firm, moist.	Augered to 10.0'.	
						38.5 38.0 37.5			8.4 - 11.0 ft: SAND, (SW); Grayish olive (10Y4/2), fine to medium grained, moderately sorted, clean in places, others with minor silt, firm, moist.	Augered to total depth of 12.0'.	
									11.0 - 11.5 ft: SILT, (ML); Light brown (5YR5/6), non plastic, very firm, moist.	3" PVC casing inserted to total depth for gamma-logging.	
									TOTAL DEPTH = 12.0 FT.	PVC casing was removed after logging and hole was backfilled with drilling spoils.	
nr = not recorded. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				National Community Bank		Last Update: 03-19-92	HOLE NO. R634



GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R635
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING		
National Community Bank			N 7950.0; E 11000.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
1-16-91	1-16-91	Hydro Group, Inc.	Mobile B-80	8"	7.0	0.0	7.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.0/71*		0	4	NA	47.5	/ none ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook <i>[Signature]</i>						

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.					
							47.5				
SS	1.5	1.3	13 18 26				47.0			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R635.
SS	2.0	1.7	40 43 24 21				45.7 45.5			0.5 - 6.2 ft: FILL; Gravelly, Silty Clay; Moderate brown (5YR3/4), with wood fragments, brick fragment between 6.0 - 6.5', gravel -20-30%, no plasticity.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	2.0	38 27 18 21				43.8 43.5				
SS	0.6	0.0	28-50/1*				41.3				Augered to 6.0'. Spoon refusal at 6.6'. Augered to -7', encountered gravel pack material similar to that used for sewer/water lines; hole abandoned.
							40.5			TOTAL DEPTH = 7.0 FT.	3" PVC casing inserted to 6.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	National Community Bank	Last Update: 03-19-92	HOLE NO. R635
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R636
SITE National Community Bank			COORDINATES N 7955.0; E 11000.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 1-16-91	COMPLETED 1-16-91	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 6.0	ROCK (FT.) 0.0	TOTAL DEPTH 6.0
CORE RECOVERY (FT./%) 0.0/0*		CORE BOXES 0	SAMPLES 0	EL. TOP CASING NA	GROUND EL. 47.5	DEPTH/EL. GROUND WATER none ATD		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL NA/NA		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Robert Cook			

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS % CORE RECOVERY	LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							47.5			(Template: MYWD)	
							47.3			0.0 - 0.2 ft: ASPHALT.	
								5		0.2 - 6.0 ft: FILL; (material similar to Hole R635) Gravelly, Silty Clay; Moderate brown (5YR3/4), with wood and brick fragment, no plasticity.	Complete borehole number is B3890R636. Augered through asphalt to 6.0'; encountered gravel pack for sewer/water line; drilling stopped.
							41.5			TOTAL DEPTH = 6.0 FT.	3" PVC casing inserted to 6.0' for gamma-logging. Borehole gamma-logged by TMA/Eberline Corp. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE National Community Bank	Last Update: 03-19-92	HOLE NO. R636
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
National Community Bank				FUSRAP		14501	1 OF 1	R637	
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING	
National Community Bank			N 8025.0; E 11028.0			Vertical		-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
1-17-91	1-17-91	Hydro Group, Inc.	Soil Sentry		8"	10.5	0.0	10.5	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
6.0/57*		0	6	NA	45.5	/ none ATD / NA		NA/NA	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in		none			Stephen Knuttel				
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS		ELEV.		DEPTH	
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.		GRAPHICS	
								SAMPLE	
								(Template: MYWD)	
								DESCRIPTION AND CLASSIFICATION	
								NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	1.5	0.7	20 22 27				45.5 45.4 45.3 44.3	0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 1.2 ft: FILL; sand and gravel, Black (N1) to Moderate brown (5YR4/4)	Complete borehole number is B3890R637.
SS	2.0	1.4	7 9 12 15				43.5 42.3 42.1 41.5 41.2	2.0 - 3.2 ft: SAND, (SP); Light brown (5YR5/6) to Moderate brown (5YR4/4), very fine to fine grained, well sorted, silty in places, clayey in others, firm, moist. 3.2 - 4.3 ft: Sandy CLAY, (CL); Olive black (10GY5/2) changing to Grayish green (10GY5/2) at 3.35'; disturbed below 4.0'; moderately plastic, firm, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	7 18 22 25				40.4 39.9 39.5	4.3 - 5.1 ft: Clayey SAND, (SC); Pale brown (5YR5/2) to Grayish brown (5YR3/2), sand is fine to coarse grained, moderately sorted, clean below 4.8', minor fine pebbles, firm, moist; layer of Silty Sand, Light brown (5YR5/6), fine grained, between 5.0 - 5.1'.	Augered to 2.0'. Augered to 4.0'. Augered to 6.0'.
SS	2.0	1.4	3 8 7 10				38.1 37.5 37.2	5.1 - 5.6 ft: Sandy GRAVEL, (GM); Dark reddish brown (10R3/4), medium coarse sandstone gravel.	Augered to 8.0'.
SS	1.1	0.3	7 25 50/1*				36.4 36.1 35.8	6.0 - 9.4 ft: SAND interlayered with Sandy SILT, (SP & ML); Sand layers between 6.0 - 6.8' and 7.0 - 7.4', Moderate brown (5YR4/4), fine grained, well sorted, clean, moderately firm, wet; Sandy Silt layers elsewhere, Light brown (5YR5/6), firm, moist.	Spoon refusal at 9.1'; augered to 9.1'.
SS	1.4	0.6	9 15 50/5*				35.0	9.4 - 9.7 ft: Gravelly, Clayey SAND, (SC); Dusky yellow (5Y6/4) to Light olive brown (5Y5/6), sand is fine to coarse grained, poorly sorted, dirty; gravel is of mixed composition, primarily granitic, subrounded to subangular; firm, moist.	Spoon refusal at 10.5'; augered to total depth of 10.5'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 10.5 FT.									
* Core recovery refers to total soil & rock sample.									
Ground elevation estimated from site topographic map.									
Description & classification by visual examination of sample.									
Colors from "Rock-Color Chart" (GSA, 1948).									
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			National Community Bank		Last Update: 03-19-92	HOLE NO. R637



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R398

SITE

I-80 Westbound Right-of-Way

COORDINATES

N 2,402.0; E 3,985.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

COMPLETED

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Tripod

SIZE

3.5"

OVERBURDEN

10.8

ROCK (FT.)

0.0

TOTAL DEPTH

10.8

CORE RECOVERY (FT./%)

6.9/64*

CORE BOXES

0

SAMPLES

6

EL. TOP CASING

NA

GROUND EL.

44.4

DEPTH/EL. GROUND WATER

▼ / -8' ATD
▼ / NA

DEPTH/EL. TOP OF ROCK

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	P.S.I.	TIME MIN.						
SS	2.0	1.4	2 5 5				44.4				0.0 - 0.8 ft: Silty SAND, (SM); Dusky brown (5YR2/2), poorly sorted, with roots, soft, moist.	<p>Complete borehole number is B3890R398.</p> <p>Hole advanced to depth by 3" OD split spoon samplers.</p> <p>Borehole sampled and gamma-logged by TMA/Eberline Corp.</p> <p>Spoon refusal at 10.8'.</p> <p>Borehole enlarged by driving 3.5" OD split spoon to depth.</p> <p>3" PVC casing inserted to 10.5' for gamma-logging.</p> <p>PVC casing was removed after logging and hole was backfilled with drilling spoils.</p> <p>* Core recovery refers to total soil & rock sample.</p> <p>Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>
SS	2.0	1.5	4 7 9 20				43.6 43.2 42.9 42.4				0.8 - 1.2 ft: Clayey SILT, (ML); Pale yellowish brown (10YR6/2), moderately plastic, soft, moist.	
SS	2.0	1.4	5 16 19 20				41.3 40.9 40.4				1.2 - 1.4 ft: SAND, (SW); Dark yellowish brown (10YR4/2), fine grained, moderately sorted, firm, moist.	
SS	2.0	1.1	9 8 30 35				39.6 39.0 38.4	5			2.0 - 3.1 ft: Clayey, Silty SAND, (SM); Moderate brown (5YR4/4) mottled with Dark yellowish orange (10YR6/6) and Moderate reddish brown (10R4/6), sand is fine grained, moderately sorted, with roots, moderately firm, moist.	
SS	2.0	1.0	16 20 29 40				37.3 36.4 35.4				3.1 - 4.8 ft: SAND, (SW); Dark reddish brown (10R3/4), fine grained, moderately sorted, minor silt, subangular sandstone gravel common below 4.0'; firm, moist.	
SS	0.8	0.5	29 50/4"				34.4 33.9 33.6	10			4.8 - 5.4 ft: Silty SAND, (SM); Moderate reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, minor sandstone gravel, silt content increasing with depth, firm, moist.	
											6.0 - 10.5 ft: Gravelly, Silty SAND to Silty GRAVEL, (SM-GM); Dark reddish brown (10R3/4), sand is fine to medium grained; gravel is angular, sandstone between 6.0 - 9.0', mixed with shale, Grayish black (N2), below; moderately firm, moist.	
TOTAL DEPTH = 10.8 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

I-80 Westbound Right-of-Way

Last Update: 10-05-92

HOLE NO.

R398



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R399
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
I-80 Westbound Right-of-Way			N 2,426.0; E 3,987.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-15-90	11-15-90	Hydro Group, Inc.	Tripod		3.5"	11.4	0.0	11.4		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
6.8/60*		0	6	NA	45.3	V / -7' ATD NA / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.0	7 7 16 32					45.3				0.0 - 1.0 ft: FILL; Silty Sand, (SM); Moderate brown (5YR3/4), with red brick fragments and debris.	Complete borehole number is B3890R399.
SS	2.0	1.5	7 9 11 14					43.3				2.0 - 3.2 ft: Clayey, Silty SAND, (SM); Light brown (5YR5/6) to Moderate brown (5YR3/4 - 5YR4/4), sand is fine to medium grained, moderately sorted, firm, moist; layer of Clayey Silt, Grayish black (N2), moderately plastic, between 2.8 - 3.0'.	Hole advanced to depth by 3" OD split spoon samplers.
SS	2.0	1.0	10 12 9 12					41.8 41.3 40.9 40.3	5			3.2 - 3.5 ft: Silty, Clayey SAND, (SC); Greenish gray (5GY6/1), sand is fine grained, moderately sorted, slightly plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	9 18 24 28					39.3 38.6				4.0 - 4.4 ft: Silty CLAY, (CL); Grayish black (N2) changing to Light brown (5YR5/6) at 4.3', plastic, firm, moist.	
SS	2.0	1.5	12 17 19 23					37.9 37.3				4.4 - 6.7 ft: SAND, (SW); Moderate brown (5YR3/4) to Moderate reddish brown (10R4/6) changing to Grayish red (5R4/2) at 6.0', fine grained, moderately sorted, minor silt and clay, moderately firm, moist.	
SS	1.4	0.4	20 32 50/5"					35.8 35.3 34.9	10			6.7 - 10.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to coarse grained, coarser with depth, poorly sorted; gravel is primarily sandstone, subrounded to subangular; firm, moist to wet.	Spoon refusal at 11.4'.
TOTAL DEPTH = 11.4 FT.												Borehole enlarged by driving 3.5" OD split spoon to depth.	
												3" PVC casing inserted to 10.5' for gamma-logging.	
												PVC casing was removed after logging and hole was backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	I-80 Westbound Right-of-Way	Last Update:	10-05-92	HOLE NO.	R399
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GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.			
I-80 Westbound Right-of-Way				N 2,450.0; E 3,992.0	FUSRAP	14501	1 OF 1 R400			
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-15-90		11-15-90	Hydro Group, Inc.	Tripod	3.5"	10.3	1.8	12.1		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
6.1/50*		0	7	NA	45.9	NA	10.3/38.6			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					
SAMP. TYPE AND DIAM.		SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	WATER PRESSURE TESTS		(Template: MYWD) DESCRIPTION AND CLASSIFICATION NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.				
LOSS IN G.P.M.		PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH				GRAPHICS	SAMPLE
SS	2.0	0.3	5 19 16 20					45.9 45.6 43.9 43.3 41.9 41.6 17 30 39.9 38.5 37.9 36.4 35.9 35.6 10 35.0 33.8	0.0 - 4.3 ft: FILL ; Silty Sand; Grayish black (N2) to Grayish brown (5YR3/2), with brick fragments and debris, roots below 4.0', firm, moist. 4.3 - 4.9 ft: Silty CLAY, (CL) ; Greenish gray (5GY6/1), moderately plastic, firm, moist; layer of fine sand, Moderate brown (5YR3/4), between 4.5 - 4.6'. 4.9 - 10.3 ft: SAND, (SP) ; Moderate brown (5YR3/4), Light brown (5YR5/6) between 8.9 - 9.1'; fine grained, interlayered with some very fine sands between 6.0 - 7.4'; moderately well sorted, clean below 8.0', firm, moist. 10.3 - 10.9 ft: Gravelly, Silty SAND, (SM) ; Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted; gravel is primarily sandstone, subrounded, angular fragments at 10.9'; firm, moist to wet. TOTAL DEPTH = 12.1 FT.	Complete borehole number is B3890R400. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 12.1'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 11.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	0.6	15 15 13 16							
SS	2.0	1.4	9 16 17 30							
SS	2.0	1.4	16 18 25 30							
SS	2.0	1.5	17 20 40 42							
SS	2.0	0.9	10 16 26 32							
SS	0.1	0.0	50/1"							
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Last Update:		HOLE NO.		
I-80 Westbound Right-of-Way				10-05-92		R400				



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R401
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
I-80 Westbound Right-of-Way			N 2,505.0; E 4,012.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-15-90	11-15-90	Hydro Group, Inc.	Tripod		3.5"	7.4	2.5	9.9		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
7.0/71*		0	5	NA	46.6	-9' ATD NA		7.4/39.2		
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in			none			Stephen Knuttel				

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	P.S.I.	TIME MIN.						
SS	2.0	1.5	5 10 9				46.6				0.0 - 3.0 ft: Silty to Gravelly SAND, (SM-SW); Grayish red (5R4/2) to Grayish brown (5YR3/2), with Dark reddish brown (10R3/4) gravel; sand is fine to medium grained, poorly to moderately sorted; gravel is mixed composition, subrounded to subangular; with roots between 0.0 - 0.8', loose to firm with depth, moist.	Complete borehole number is B3890R401.
SS	2.0	1.5	6 8 13 11				45.1 44.6 43.6 43.1 42.6				3.0 - 7.4 ft: SAND, (SP); Moderate brown (5YR3/4), mottled with Grayish red (5R4/2) between 3.0 - 5.4'; fine grained, moderately well sorted, fine layers between 6.0 - 7.4', firm, moist; clasts composed of Silty Clay, Greenish gray (5GY6/1), up to 2 cm common between 4.0 - 5.4'.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	6 25 20 20				41.2 40.6	5			7.4 - 9.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to coarse grained, poorly sorted; gravel is sandstone, angular between 7.4 - 8.4, subrounded to subangular below; firm, moist to wet.	Spoon refusal at 9.9'. Borehole enlarged by driving 3.5" OD split spoon to depth.
SS	2.0	1.6	26 28 28 28				39.2 39.0 38.6				TOTAL DEPTH = 9.9 FT.	3" PVC casing inserted to 9.7' for gamma-logging.
SS	1.9	1.0	21 21 37 50/5"				37.6 36.7					PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	I-80 Westbound Right-of-Way	Last Update:	10-07-92	HOLE NO.	R401
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R402
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
I-80 Westbound-Right-of-Way			N 2,362.0; E 4,013.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-16-90	11-16-90	Hydro Group, Inc.	Tripod	3.5"	12.8	0.0	12.8			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.4/42*		0	7	NA	44.9	-8' ATD		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Stephen Knuttel <i>[Signature]</i>						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	0.7	12 3 2 7				44.9				(Template: MYWD) Complete borehole number is B3890R402. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 12.8'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 12.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.0	8 4 6 6				44.2		0.0 - 3.0 ft: Silty SAND, (SM); Grayish brown (5YR3/2), changing to Moderate brown (5YR4/4) at 2.3', sand is fine to medium grained, poorly to moderately sorted, with roots; gravelly between 0.0 - 0.7, content decreases with depth; loose to firm with depth, slightly moist.		
SS	2.0	0.4	8 8 12 18				42.9 41.9		4.0 - 4.4 ft: SAND, (SP); Pale yellowish brown (10YR6/2), fine grained, moderately well sorted, minor silt, firm, moist.		
SS	2.0	0.9	8 18 19 12				40.9 40.5	5	6.0 - 6.9 ft: Silty SAND, (SM); Grayish red (5R46/2), sand is fine to coarse grained, poorly sorted, subrounded to subangular gravel of mixed composition and sedimentary clasts present, moderately firm, moist.		
SS	2.0	1.3	14 30 32 30				38.9 38.0		8.0 - 8.3 ft: SAND, (SP); Moderate brown (5YR4/4), medium grained, moderately well sorted, loose, moist to wet.		
SS	2.0	1.1	23 40 25 27				36.9 36.6 35.6	10	8.3 - 11.1 ft: Silty, Sandy GRAVEL, (GM); Dark reddish brown (10R3/4); gravel is of mixed composition, up to 0.2', subrounded to angular; sand is fine to coarse grained, poorly sorted, stiff, wet.		
SS	0.8	0.0	29 50/3"				34.9 33.8				
							32.1		TOTAL DEPTH = 12.8 FT.		

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	I-80 Westbound-Right-of-Way	Last Update: 10-08-92	HOLE NO. R402
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R403
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING	
I-80 Westbound-Right-of-Way			N 2,360.0; E 3,974.0			Vertical			-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-16-90	11-16-90	Hydro Group, Inc.	Tripod		3.5"	10.0	0.0	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
6.4/64*		0	5	NA	44.1	↓ / none ATD ↓ / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>					

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	7 10 17 20				44.1					
SS	2.0	1.6	18 11 11 10				42.7 42.1 41.5 41.0 40.5 40.1				0.0 - 2.6 ft: Clayey, Silty SAND, (SM); Light brown (5YR5/6) mottled with Dark reddish brown (10R3/4) and Grayish red (5R4/2), poorly sorted, minor gravel, firm, moist.	Complete borehole number is B3890R403.
SS	2.0	1.3	11 11 11 23				38.8 38.1	5			2.6 - 3.1 ft: Clayey, Sandy SILT, (ML); Grayish black (N2); minor roots, slightly plastic, firm, moist. 3.1 - 3.6 ft: Silty CLAY, (CL); Grayish green (5G5/2) mottled with Dark yellowish orange (10YR6/6), with minor sand, high plasticity, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.1	9 21 24 29				37.0				4.0 - 5.3 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/6), with common sedimentary clast composed of Silty and Sandy Clay, Grayish olive (10Y4/2), up to 0.1; slightly plastic, firm, moist.	
SS	2.0	1.0	40 30 30 27				36.1 35.1				6.0 - 9.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted; gravel is mixed, primarily sandstone, subrounded to subangular; firm, moist.	
							34.1	10			TOTAL DEPTH = 10.0 FT.	Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

I-80 Westbound-Right-of-Way

Last Update: 10-08-92

HOLE NO. R403



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
I-80 Westbound-Right-of-Way				FUSRAP		14501	1 OF 1	R404	
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING	
I-80 Westbound-Right-of-Way			N 2,350.0; E 4,009.0			Vertical		-----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
11-16-90	11-16-90	Hydro Group, Inc.		Tripod		3.5"	9.3	0.0	9.3
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
6.0/65*		0	5	NA	44.7	-8.5' ATD / NA		NA/NA	
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:			
140 lbs/30 in			none			Stephen Knuttel			
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.F. TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: MYWD)
									DESCRIPTION AND CLASSIFICATION
SS	2.0	1.5	20 23 7 5			44.7			0.0 - 1.2 ft: Gravelly SAND, (SW); Moderate reddish brown (10R4/6) to Moderate brown (5YR4/4), sand is fine to medium grained, poorly sorted, loose, slightly moist.
SS	2.0	1.4	7 9 15 19			43.5 43.2 42.7 42.5 42.2 41.9 41.3			1.2 - 2.2 ft: WOOD; Black (N1), with debris.
SS	2.0	1.2	9 16 26 40			40.7			2.2 - 2.5 ft: Silty SAND, (SM); Blackish red (5R2/2), sand is fine grained, poorly sorted, firm, moist.
SS	2.0	1.2	30 25 27			39.5 38.7	5		2.5 - 2.8 ft: Clayey SILT, (ML); Grayish black (N2); some roots, low plasticity, firm, moist.
SS	2.0	1.2	40 30 25 27			37.5			2.8 - 3.4 ft: SAND, (SW); Pale yellowish brown (10YR6/2) changing to Moderate reddish brown (10R4/6) at 3.0', fine to medium grained, coarser with depth, poorly to moderately sorted, minor gravel below 3.0', firm, moist.
SS	1.3	0.7	20 35 50/4"			36.7 36.0 35.4			4.0 - 8.7 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly sorted; gravel is mixed, primarily sandstone; firm, moist to wet.
TOTAL DEPTH = 9.3 FT.									Spoon refusal at 9.3'. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted to 8.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
* Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).									
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			I-80 Westbound-Right-of-Way		Last Update: 10-08-92	HOLE NO. R404



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.																																	
I-80 Westbound-Right-of-Way										FUSRAP		14501	1 OF 1	R405																																	
SITE			COORDINATES					ANGLE FROM HORIZ		BEARING																																					
I-80 Westbound-Right-of-Way			N 2,370.0; E 4,021.0					Vertical		-----																																					
BEGUN	COMPLETED	DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH																																					
11-16-90	11-16-90	Hydro Group, Inc.			Tripod		3.5"	2.1	0.0	2.1																																					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK																																							
0.8/38*		0	2	NA	45.0	none ATD NA		NA/NA																																							
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:																																									
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>																																									
<table border="1"> <thead> <tr> <th rowspan="2">SAMP TYPE AND DIAM.</th> <th rowspan="2">SAMP. ADV. LEN CORE</th> <th rowspan="2">SAMP. REC. CORE REC.</th> <th rowspan="2">SAMPLE BLOWS % CORE RECOVERY</th> <th colspan="3">WATER PRESSURE TESTS</th> <th rowspan="2">ELEV.</th> <th rowspan="2">DEPTH</th> <th rowspan="2">GRAPHICS SAMPLE</th> <th rowspan="2">DESCRIPTION AND CLASSIFICATION</th> <th rowspan="2">NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.</th> </tr> <tr> <th>LOSS IN G.P.M.</th> <th>PRESS. P.S.I.</th> <th>TIME IN MIN.</th> </tr> </thead> <tbody> <tr> <td>SS</td> <td>2.0</td> <td>0.8</td> <td>11 11 6 13</td> <td></td> <td></td> <td></td> <td>45.0</td> <td></td> <td></td> <td>0.0 - 0.8 ft: FILL; Gravelly, Silty Sand.</td> <td rowspan="2"> Complete borehole number is B3890R405. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 2.1'. Gamma-logging completed in open borehole. Borehole backfilled with drilling spoils after completion of gamma-logging. </td> </tr> <tr> <td>SS</td> <td>0.1</td> <td>0.0</td> <td>50/1*</td> <td></td> <td></td> <td></td> <td>44.2</td> <td></td> <td></td> <td>TOTAL DEPTH = 2.1 FT.</td> </tr> </tbody> </table>										SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.	SS	2.0	0.8	11 11 6 13				45.0			0.0 - 0.8 ft: FILL; Gravelly, Silty Sand.	Complete borehole number is B3890R405. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 2.1'. Gamma-logging completed in open borehole. Borehole backfilled with drilling spoils after completion of gamma-logging.	SS	0.1	0.0	50/1*				44.2			TOTAL DEPTH = 2.1 FT.
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE					DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.																																
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.																																									
SS	2.0	0.8	11 11 6 13				45.0			0.0 - 0.8 ft: FILL; Gravelly, Silty Sand.	Complete borehole number is B3890R405. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 2.1'. Gamma-logging completed in open borehole. Borehole backfilled with drilling spoils after completion of gamma-logging.																																				
SS	0.1	0.0	50/1*				44.2			TOTAL DEPTH = 2.1 FT.																																					
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER										SITE		I-80 Westbound-Right-of-Way		Last Update: 10-08-92		HOLE NO. R405																															



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
SITE				COORDINATES		14501	1 OF 1	R406					
I-80 Westbound-Right-of-Way				N 2,411.0; E 4,035.0		ANGLE FROM HORIZ BEARING							
BEGUN			COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-16-90			11-16-90	Hydro Group, Inc.	Tripod	3.5"	8.0	0.0	8.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
4.9/61*		0	4	NA	45.4	-7' ATD		NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLINDS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.3	21				45.4					(Template: MYWD) 0.0 - 4.4 ft: Gravelly, Silty SAND, (SM); Moderate brown (5YR3/4), poorly sorted; 0.25' sandstone fragment between 2.2 - 2.5'; firm, slightly moist (Fill?). 4.4 - 5.2 ft: SAND (SW - SM); Light olive gray (5Y5/2), mottled with Moderate olive brown (5Y4/4) between 4.6 - 4.8' changing to Pale yellowish brown (10YR6/2) at 4.8'; fine to medium grained, silty very fine sand between 4.6 - 4.8'; moderately sorted, firm, slightly moist. 6.0 - 6.2 ft: Clayey SILT, (ML); Grayish black (N2), firm, moist. 6.2 - 6.6 ft: SAND to Sandy GRAVEL, (GP); Grayish olive (10Y4/2) changing to Grayish red (5R4/2) at 6.4'; sand is fine, grading to gravel up to 2 cm; moderately sorted, gravel is subangular to angular, firm, slightly moist. 6.6 - 7.9 ft: SILT Interlayered with SAND, (ML - SP); Light brown (5YR5/6), Moderate yellowish brown (10YR5/4) between 7.2 - 7.5'; sand is very fine, wet; silt is firm, slightly moist; layer of medium sand, Pale brown (5YR5/2), between 9.8 - 9.9'. TOTAL DEPTH = 8.0 FT.	Complete borehole number is B3890R406. Hole advanced to depth by 3" OD split spoon samplers. Borehole sampled and gamma-logged by TMA/Eberline Corp. Borehole enlarged by driving 3.5" OD split spoon to depth. 3" PVC casing inserted for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			25				44.1						
			30				43.4						
SS	2.0	0.5	9				42.9						
			14				41.4						
			20				41.0						
			23				40.2						
SS	2.0	1.2	11				39.4						
			16				39.2						
			19				38.8						
			24				37.5						
SS	2.0	1.9	10				37.4						
			12										
			14										
			20										

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

I-80 Westbound-Right-of-Way

Last Update: 10-08-92

HOLE NO. R406



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
I-80 Westbound Right-of-Way										FUSRAP		14501	1 OF 1	R407
SITE										COORDINATES		ANGLE FROM HORIZ	BEARING	
N 2,524.0; E 4,119.0										Vertical	-----			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
11-19-90		11-19-90		Hydro Group, Inc.		Soil Sentry		8"	6.2	3.8	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING		GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
5.7/57*		0	5	NA		47.5	-7.5' ATD / NA		6.2/41.3					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			Stephen Knuttel								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
SS	2.0	1.2	6 29 30 40				47.5			0.0 - 3.2 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, minor sandstone gravel, with roots between 0.0 - 1.2', firm, moist.	Complete borehole number is B3890R407.			
SS	2.0	1.2	9 17 21 25				46.3				Augered through asphalt to 0.2'.			
SS	2.0	1.2	15 7 19 25				45.5			4.0 - 6.2 ft: Silty to Clayey SAND, (SM-SC); Moderate reddish brown (10R4/6) to Pale reddish brown (10R5/4); sand is fine grained, moderately sorted; clayey intervals are moderately plastic; firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.			
SS	2.0	1.0	6 15 25 25				44.3	5						
SS	2.0	1.1	11 7 11 19				43.5			6.2 - 9.1 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted; gravel is sandstone, subrounded to subangular, firm, moist to wet.	Augered to 8.0'.			
							42.3							
							41.5							
							41.3							
							40.5							
							39.5							
							38.4							
							37.5	10		TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.			
											* Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).			

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE I-80 Westbound Right-of-Way

Last Update: 10-07-92 HOLE NO. R407



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
I-80 Westbound Right-of-Way				FUSRAP		14501	1 OF 1	R408		
SITE		COORDINATES			ANGLE FROM HORIZ		BEARING			
I-80 Westbound Right-of-Way		N 2,635.0; E 4,125.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-19-90	11-19-90	Hydro Group, Inc.		Soil Sentry	8"	8.0	2.0	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.3/53*		0	5	NA	47.1	none ATD NA		8.0/39.1		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS % CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.						TIME MIN.
SS	1.8	1.2	25/4" 27 17 16			47.1 46.9			(Template: MYWD) Complete borehole number is B3890R408. Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 8.0'. Augered to total depth of 10.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS	2.0	1.1	6 16 25 35			45.1 44.0		0.0 - 0.4 ft: ASPHALT, over sand and gravel. 0.4 - 5.0 ft: SAND, (SW); Moderate brown (5YR3/4), Pale yellowish brown (10YR6/2) to Dark yellowish brown (10YR4/2) between 2.0 - 3.1', mottled with Pale reddish brown (10R5/4) between 4.0 - 5.0'; fine to medium grained, moderately sorted; minor gravel up to 0.2' between 2.0 - 5.0'; loose to firm with depth, moist.		
SS	2.0	1.0	10 21 29 35			43.1 42.1	5	6.0 - 7.1 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted; gravel is mixed composition, subrounded to subangular; firm, moist.		
SS	2.0	1.1	19 25 29 27			41.1 40.0		8.0 - 8.9 ft: Silty, Gravelly SAND, (SW); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted; gravel is sandstone, angular, slightly weathered; firm, moist.		
SS	2.0	0.9	28 23 49 25			39.1 38.2				
						37.1	10	TOTAL DEPTH = 10.0 FT.		
SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER				SITE		I-80 Westbound Right-of-Way		Last Update: 10-05-92	HOLE NO. R408	



GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.						
I-80 Westbound Right-of-Way				N 2,448.0; E 3,950.0	FUSRAP	14501	1 OF 1 R409						
BEGUN		COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
11-19-90		11-19-90	Hydro Group, Inc.	Soil Sentry	8"	10.0	0.0	10.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK						
7.1/71*		0	5	NA	46.7	∇ / none ATD / NA	NA/NA						
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			Stephen Knuttel <i>[Signature]</i>								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS				ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.	(Template: MYWD)						
SS	2.0	1.5	6 12 25 19				46.7				0.0 - 4.5 ft: Silty SAND, (SM); Dark reddish brown (10R3/4) changing to Blackish red (5R2/2) at 2.0', sand is fine grained, moderately sorted, minor sandstone gravel, firm, moist.	Complete borehole number is B3890R409.	
SS	2.0	1.4	12 16 28 35				45.2 44.7					Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.4	6 14 18 19				43.3 42.7 42.2 41.7 41.4 41.3				4.5 - 5.3 ft: Clayey SAND and Silty CLAY, (SC & CL); Brownish black (5YR2/1) changing to Grayish black (N2) at 5.1'; sand is fine to medium grained, moderately sorted, with minor subrounded gravel; changing at 5.1' to clay, moderately plastic with minor sand; firm, moist.	Augered to 6.0'.	
SS	2.0	1.3	15 25 25 42				40.7 40.5 40.3 39.4				5.4 - 6.4 ft: Clayey SAND and Silty CLAY, (SC & CL); Light olive gray (5Y5/2) changing to Grayish green (10GY5/2) at 6.2'; sand is fine grained, moderately sorted; changing at 6.2' to clay, plastic; firm, moist.	Augered to 8.0'.	
SS	2.0	1.5	14 25 23 21				38.7 37.8 37.2 36.7				6.4 - 9.5 ft: SAND, (SP); Pale brown (5YR5/2); with layer of Sandy Silt, mottled with Light brown (5YR5/6) between 8.0 - 8.9'; fine grained, moderately well sorted, minor sedimentary clast and pebbles, firm, moist.	Augered to total depth of 10.0'.	
TOTAL DEPTH = 10.0 FT.											3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.		
* Core recovery refers to total soil & rock sample.											Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.		
Description & classification by visual examination of sample.											Colors from "Rock-Color Chart" (GSA, 1948).		
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				I-80 Westbound Right-of-Way		Last Update: 09-28-92		HOLE NO. R409	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
I-80 Westbound Right-of-Way				FUSRAP		14501	1 OF 1	R410	
SITE		COORDINATES				ANGLE FROM HORIZ		BEARING	
I-80 Westbound Right-of-Way		N 2,740.0; E 4,129.0				Vertical		-----	
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	
11-19-90	11-19-90	Hydro Group, Inc.		Soil Sentry		8"	10.0	0.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
6.2/62*		0	5	NA	49.5	V / none ATD / NA		NA/NA	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:				
140 lbs/30 in		none			Stephen Knuttel				
SAMP TYPE AND DIAH.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	LOSS	WATER PRESSURE TESTS		ELEV.	DEPTH	
					IN G.P.M.	PRESS. P.S.F.			TIME MIN.
SS	1.8	1.4	35/4" 39 40 40				49.5 49.3 49.2		
SS	2.0	1.3	16 28 25 18				47.9 47.5 47.3 47.1		
SS	2.0	1.5	10 20 28 33				46.2 45.5 45.1 44.6	5	
SS	2.0	0.9	18 25 28 40				44.0 43.5 42.7 42.6		
SS	2.0	1.1	10 20 22 25				41.5 40.4		
							39.5	10	
								TOTAL DEPTH = 10.0 FT.	
								Augered to total depth of 10.0'.	
								3" PVC casing inserted to total depth for gamma-logging.	
								PVC casing was removed after logging and hole was backfilled with drilling spoils.	
								* Core recovery refers to total soil & rock sample.	
								Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.	
								Description & classification by visual examination of sample.	
								Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		I-80 Westbound Right-of-Way		Last Update: 10-07-92	HOLE NO. R410



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
I-80 Westbound Right-of-Way				FUSRAP		14501	1 OF 1	R411			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
I-80 Westbound Right-of-Way			N 2,827.0; E 4,129.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
11-20-90	11-20-90	Hydro Group, Inc.		Soil Sentry		8"	5.0	3.0	8.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.2/65*		0	4	NA	51.4	/ none ATD / NA		5.0/46.4			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>					
(Template: MYWD)											
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
SS	1.8	1.3	45/4" 40 40 32				51.4 51.0		0.0 - 0.4 ft: ASPHALT; over gravel, Dark gray (NS).	Complete borehole number is B3890R411. Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.2	21 24 35 40				49.9 49.4		0.4 - 1.3 ft: SAND, (SW); Moderate brown (5YR3/4), medium grained, moderately sorted, minor rounded gravel, moderately firm, moist.		
SS	2.0	1.5	21 29 32 39				48.2 47.4		2.0 - 5.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted; gravel is primarily sandstone, subrounded to subangular; firm, moist.		
SS	2.0	1.2	21 27 30 45				46.4 45.9 45.4	5	5.0 - 7.2 ft: Gravelly SAND, (SW); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted; interlayered with sandstone gravel, angular, fresh; minor silt, firm, moist.		
TOTAL DEPTH = 8.0 FT.											Augered to total depth of 8.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
* Core recovery refers to total soil & rock sample.											
Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.											
Description & classification by visual examination of sample.											
Colors from "Rock-Color Chart" (GSA, 1948).											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			I-80 Westbound Right-of-Way		Last Update: 10-07-92		HOLE NO. R411	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R412				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
I-80 Westbound Right-of-Way			N 2,931.0; E 4,128.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-20-90	11-20-90	Hydro Group, Inc.		Soil Sentry	8"	8.0	2.0	10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
5.2/52*		0	5	NA	53.6	↓ / none ATD ↓ / NA		8.0/45.6				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLONS	% CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.							TIME MIN.
SS	2.0	0.4	nr				53.6 53.4				0.0 - 0.5 ft: ASPHALT; over coarse sand, Dark gray (N3).	Complete borehole number is B3890R412.
SS	2.0	1.1	8 23 30 37				51.6 50.5				2.0 - 7.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted; gravel is sandstone, rounded to subangular; firm, moist.	Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon skewed when driven, rock caught in cutter; augered to 2.0'.
SS	2.0	1.0	29 31 35 39				49.6 48.6	5				
SS	2.0	1.4	5 10 14 15				47.6 46.2 45.6					
SS	2.0	1.3	26 29 35 40				44.3 43.6				8.0 - 9.3 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted; gravel is sandstone, angular, slightly weathered; firm, moist.	Augered to 8.0'.
								10			TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
												nr = not recorded. * Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			I-80 Westbound Right-of-Way			Last Update: 10-07-92		HOLE NO. R412	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE I-80 Westbound Right-of-Way				COORDINATES N 2,667.0; E 4,052.0		14501	1 OF 1	R413				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-20-90	11-20-90	Hydro Group, Inc.	Soil Sentry		8"	8.4	3.6	12.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
8.0/67*		0	5	NA	48.5	▼ / -10' ATD ▼ / NA	8.4/40.1					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in			none		Stephen Knuttel <i>[Signature]</i>							
(Template: MYWD)												
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS	% CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS PRESS. P.S.F. TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	2.0	1.5	4	10			48.5			0.0 - 2.3 ft: Gravelly Silty SAND, (SM); Blackish red (5R2/2) changing to Dark reddish brown (10R3/4) at 0.5', sand is fine grained, moderately sorted, firm, moist.	Complete borehole number is B3890R413.	
SS	2.0	1.3	5	7			47.0			2.3 - 2.5 ft: Clayey SILT, (ML); Grayish black (N2); moderately firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
			7	10			46.5					
SS	2.0	1.3	7	15			46.2			2.5 - 7.1 ft: SAND, (SW); Pale brown (5YR5/2), mottled with Light brown (5YR5/6) and Dark yellowish brown (10YR5/6) between 4.0 - 5.0' and 6.3 - 6.9'; fine to medium grained, moderately sorted; minor silt and clay with some gravel between 2.5 - 3.3'; loose to firm, moist; layer of Silt, Light brown (5YR6/4) between 7.0 - 7.1'.	Augered to 6.0'.	
			21	32			45.2					
			14	17			44.5					
SS	2.0	1.6	14	17			43.2	5		7.1 - 8.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted; gravel is mixed composition, subrounded to subangular; firm, moist.	Augered to 8.0'.	
			25	30			42.5					
SS	2.0	1.2	9	17			41.4			8.4 - 11.1 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted; gravel is sandstone, angular, with some subangular pieces, slightly weathered; firm, moist to wet below 10'.	Augered to 10.0'.	
			28	50			40.9					
			10	14			40.5					
SS	2.0	1.1	10	29			40.1	10			Augered to total depth of 12.0'.	
			14	42			39.3					
							38.5				TOTAL DEPTH = 12.0 FT.	
							37.4					
							36.5				Augered to total depth of 12.0'.	
										3" PVC casing inserted to 11.5' for gamma-logging.		
										PVC casing was removed after logging and hole was backfilled with drilling spoils.		
										* Core recovery refers to total soil & rock sample.		
										Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.		
										Description & classification by visual examination of sample.		
										Colors from "Rock-Color Chart" (GSA, 1948).		
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			I-80 Westbound Right-of-Way			Last Update: 10-07-92		HOLE NO. R413	



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
SITE				COORDINATES		14501	1 OF 1	R414				
NCB Dirt Parking Area				N 2,440.0; E 4,077.0		Vertical		-----				
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-21-90	11-21-90	Hydro Group, Inc.	Mobile B-80		8"	6.0	0.0	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
4.6/77*		0	3	NA	46.0	/ none ATD / NA		NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:								
140 lbs/30 in		none		Robert Cook								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.2	26 12 14 21				46.0					(Template: MYWD)
							44.8					0.0 - 3.3 ft: SILT, (ML); Grayish brown (5YR3/2), silt -90%, sand and gravel -10%, fine grained, no plasticity.
SS	2.0	1.6	16 8 10 11				44.0					Complete borehole number is B3890R414.
							42.8					Borehole monitored for organic vapors by TMA/Eberline Corp.
							42.4					Augered to 2.0'.
SS	2.0	1.8	21 13 32 43				42.0					Augered to 4.0'.
							41.5					3.3 - 4.5 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) changing to Grayish brown (5YR3/2) at 4.0', silt -80-90%, clay -10%, with sand -10% below 4.0', low plasticity, moist.
							40.8					4.5 - 5.2 ft: Clayey, Silty SAND, (SM); Brownish gray (5YR4/1) stained in places with Medium bluish gray (5B5/1), sand -70%, silt -15%, clay -15%, low plasticity.
							40.2					5.2 - 5.8 ft: SAND, (SP); Pale brown (5YR5/2), fine to medium grained, well sorted, no plasticity, firm, moist.
							40.0					Augered to total depth of 6.0'.
							40.0					Drillers refused to continue drilling due to high organic ppms in breathing zone.
												Hole was backfilled with drilling spoils.
TOTAL DEPTH = 6.0 FT.												
SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER												
SITE												
NCB Dirt Parking Area												
Last Update: 09-23-92												
HOLE NO. R414												



GEOLOGIC DRILL LOG										PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
SITE I-80 Westbound-Right-of-Way										COORDINATES N 2,435.0; E 4,016.0				ANGLE FROM HORIZ Vertical		BEARING -----	
BEGUN 11-21-90		COMPLETED 11-21-90		DRILLER Hydro Group, Inc.			DRILL MAKE AND MODEL Mobile B-80		SIZE 8"	OVERBURDEN 8.0	ROCK (FT.) 0.0	TOTAL DEPTH 8.0					
CORE RECOVERY (FT./%) 6.3/79*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA		GROUND EL. 45.7	DEPTH/EL. GROUND WATER / none ATD / NA			DEPTH/EL. TOP OF ROCK NA/NA							
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in			CASING LEFT IN HOLE: DIA./LENGTH none				LOGGED BY: Robert Cook <i>[Signature]</i>										
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.					
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.											
SS	2.0	1.6	14 9 13				45.7				(Template: MYWD)						
							44.1				0.0 - 2.5 ft: Sandy SILT, (ML); Grayish brown (5YR3/2), silt -80%, sand -15%, gravel -5%, fine grained, no plasticity, moist.	Complete borehole number is B3890R415.					
SS	2.0	1.7	9 5 8				43.7 43.2				2.5 - 4.4 ft: Clayey SILT, (ML); Dusky yellowish brown (10YR2/2) with layers of Moderate brown (5YR3/4), layers 0.25 - 0.5" thick; silt -70%, clay -30%, low plasticity, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.					
SS	2.0	1.5	12 18 20 36				42.0 41.7 41.3				4.4 - 5.4 ft: Silty CLAY, (CL); Medium bluish gray (5B5/1), clay -70%, silt -30%, low plasticity.	Augered to 2.0'. Augered to 4.0'.					
SS	2.0	1.5	20 18 19 25				40.3 40.2 39.7	5			5.4 - 7.5 ft: SAND, (SW); Pale brown (5YR5/2), fine to coarse grained, well graded, no plasticity, wet.	Augered to 6.0'.					
							38.2 37.7				TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.					
* Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).																	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

I-80 Westbound-Right-of-Way

Last Update:
10-08-92

HOLE NO.
R415



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
I-80 Westbound Right-of-Way				FUSRAP		14501	1 OF 1	R417					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
I-80 Westbound Right-of-Way			N 2,440.0; E 3,990.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)					
12-12-90	12-12-90	Hydro Group, Inc.		Soil Sentry		8"	10.1	0.0					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
5.8/57*		0	6	NA	46.4	-8' ATD NA		NA/NA					
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in			none			Stephen Knuttel <i>[Signature]</i>							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.							
SS	2.0	1.0	2 4 24 10					46.4				(Template: MYWD) 0.0 - 4.9 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), minor Moderate reddish brown (10R4/6) below 2.0', minor roots and cement fragments between 0.0 - 1.0', firm, moist (partial fill?). 4.9 - 6.2 ft: Clayey SAND, (SC); Greenish gray (5GY6/1), sand is fine grained, moderately plastic, firm, moist. 6.2 - 9.5 ft: SAND, (SP); Pale yellowish brown (10YR6/2) changing to Pale brown (5YR5/2) at 8.0', fine grained, with medium sand and minor rounded pebbles below 8.0'; moderately to moderately well sorted, firm, moist to wet; layer of Silty Clay, Greenish gray (5GY6/1) mottled with Dark yellowish orange (10YR6/6), plastic, between 6.9 - 7.1'. 10.0 - 10.1 ft: GRAVEL; Dark reddish brown (10R3/4), subrounded sandstone fragment. TOTAL DEPTH = 10.1 FT.	
SS	2.0	0.9	6 16 18 24					45.4					Complete borehole number is B3890R417. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 6.0'. Augered to 10.0'. Spoon refusal at 10.1'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	1.0	10 10 10 10					44.4					
SS	2.0	1.3	10 12 12 25					43.5					
SS	2.0	1.5	14 18 32 42					42.4					
SS	0.1	0.1	50/1"					41.5	5				
								41.4					
								40.4					
								40.2					
								39.5					
								39.3					
								39.1					
								38.4					
								36.9					
								36.5	10				
								35.3					

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

I-80 Westbound Right-of-Way

Last Update: 10-05-92

HOLE NO. R417



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
I-80 Westbound Right-of-Way			FUSRAP	14501	1 OF 1	R418
SITE		COORDINATES			ANGLE FROM HORIZ	BEARING
12-12-90		N 2,438.0; E 3,970.0			Vertical	-----
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
12-12-90	12-12-90	Hydro Group, Inc.	Soil Sentry	8"	8.5	0.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
5.6/66*	0	4	NA	46.3	7' / -7' ATD NA	NA/NA
SAMPLE HAMMER WEIGHT/FALL	CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:			
140 lbs/30 in	none		Stephen Knuttel <i>[Signature]</i>			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.6	4	9				46.3				0.0 - 2.2 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted, roots between 0.0 - 0.5', moderately firm, moist.	Complete borehole number is B3890R418.
SS	2.0	1.3	7	9				44.7 44.3 44.1				2.2 - 4.2 ft: Clayey SILT, (ML); Grayish black (N2); minor sand and fine gravel, slightly plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.9	14	18				42.3 42.1		5		4.2 - 6.5 ft: Silty CLAY grading to Clayey SAND, (CL-SC); Greenish gray (5GY6/1), mottled with Dark yellowish brown (10YR4/2) between 4.2 - 4.9'; sand is fine grained, content increasing with depth; plasticity decreasing with depth; minor fine gravel between 4.2 - 4.9'; firm, moist.	Augered to 6.0'.
SS	2.0	1.8	10	30				41.4 40.3 39.8				6.5 - 7.8 ft: Gravelly SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly to moderately sorted; silty between 6.5 - 7.0'; firm, wet.	Augered to total depth of 8.5'.
TOTAL DEPTH = 8.5 FT.												3* PVC casing inserted to total depth for gamma-logging.	
												PVC casing was removed after logging and hole was grouted to -3' below surface and remaining hole backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	I-80 Westbound Right-of-Way	Last Update: 10-07-92	HOLE NO. R418
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R419
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
I-80 Westbound Right-of-Way			N 2,427.0; E 3,970.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
12-12-90	12-12-90	Hydro Group, Inc.	Soil Sentry		8"	10.0	0.0	10.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.3/53*		0	5	NA	45.9	-9' ATD		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	0.6	4					45.9				(Template: MYWD)	
			6					45.3				0.0 - 2.2 ft: Silty SAND, (SM); Grayish brown (5YR3/2) changing to Very dusky red (10R2/2) at 2.0', sand is fine grained, moderately sorted, roots between 0.0 - 0.6', gravelly below 2.0', moderately firm, moist.	Complete borehole number is B3890R419.
SS	2.0	0.7	6					43.9				2.2 - 4.9 ft: Clayey SAND, (SC); Blackish red (5R2/2) with layers of Grayish black (N2), some Moderate brown (5YR3/4) layers below 4.0'; sand content increases with depth, slightly plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			6					43.7					
			6					43.2					
SS	2.0	1.6	6					41.9				4.9 - 6.2 ft: Sandy CLAY, (CL); Greenish gray (5GY6/1), mottled with Light brown (5YR5/6), sand is fine grained, high plasticity, firm, moist.	Augered to 4.0'.
			7					41.0					
			10					40.3	5				
			15					39.9					
SS	2.0	1.6	8					39.9				6.2 - 8.8 ft: SAND, (SW); Dark reddish brown (10R3/4), fine to medium grained, moderately sorted; minor gravel of mixed composition, subrounded to subangular; moderately firm, wet.	Augered to 8.0'
			20					39.7					
			22					38.3					
			28					37.9					
SS	2.0	0.8	10					37.1					
			10					35.9	10			TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging and hole was grouted to -3' below surface and remaining hole backfilled with drilling spoils.
			25										
			32										

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	I-80 Westbound Right-of-Way	Last Update:	10-05-92	HOLE NO.	R419
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
I-80 Westbound Right-of-Way			FUSRAP	14501	1 OF 1	R420
SITE		COORDINATES			ANGLE FROM HORIZ BEARING	
12-12-90		N 2,448.0; E 3,969.0			Vertical -----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
12-12-90	12-12-90	Hydro Group, Inc.	Soil Sentry	8"	10.0	0.0
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
6.1/61*	0	5	NA	46.3	-9' ATD	NA/NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Stephen Knuttel		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS / CORE RECOVERY	LOSS ON DRY G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.2	4 5 7 10				46.3				0.0 - 4.1 ft: Silty SAND, (SM); Very dusky red (10R2/2), with Dark reddish brown (10R3/4) gravel between 2.6 - 3.1'; roots and some cement fragments between 0.0 - 0.7', firm, moist (Fill?).	Complete borehole number is B3890R420.
SS	2.0	1.1	5 7 9 10				45.1					Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.4	5 7 18 32				44.3				4.1 - 4.6 ft: Silty CLAY, (CL); Grayish black (N2), high plasticity; 0.1' sandstone fragment between 4.5 - 4.6'; firm, moist.	Augered to 4.0'.
SS	2.0	1.4	25 27 34 32				43.2				4.6 - 4.9 ft: Sandy CLAY, (CL); Greenish gray (5GY6/1), sand is fine grained, moderately plastic, firm, moist.	Augered to 6.0'.
SS	2.0	1.0	8 25 30 32				42.3				4.9 - 6.9 ft: SAND, (SW); Moderate brown (5YR4/4); fine grained, some coarse sand and fine gravel, increasing with depth; moderately sorted, slightly clayey in places, firm, wet.	Augered to 8.0'.
							41.7				6.9 - 7.4 ft: Clayey SAND, (SC); Grayish red (5R4/2), sand is fine grained, moderately well sorted, firm, moist.	Augered to total depth of 10.0'.
							41.4				8.0 - 9.0 ft: Gravelly SAND, (SW); Dark reddish brown (10R3/4), sand is medium to coarse grained, poorly sorted; gravel up to 0.2', subrounded to subangular; loose, wet.	3" PVC casing inserted to 9.0' for gamma-logging.
							40.9					PVC casing was removed after logging and hole was backfilled with drilling spoils.
							40.3					* Core recovery refers to total soil & rock sample.
							39.4					Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.
							38.9					Description & classification by visual examination of sample.
							38.3					Colors from "Rock-Color Chart" (GSA, 1948).
							37.3					
							36.3	10				
TOTAL DEPTH = 10.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	I-80 Westbound Right-of-Way	Last Update: 10-07-92	HOLE NO. R420
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GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R421
SITE I-80 Westbound Right-of-Way			COORDINATES N 2,433.0; E 3,950.0			ANGLE FROM HORIZON BEARING Vertical		
BEGUN 12-13-90	COMPLETED 12-13-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Soil Sentry		SIZE 8"	OVERBURDEN 15.0	ROCK (FT.) 0.0	TOTAL DEPTH 15.0
CORE RECOVERY (FT./%) 9.2/61*		CORE BOXES 0	SAMPLES 7	EL. TOP CASING NA	GROUND EL. 46.6	DEPTH/EL. GROUND WATER 9' / -9' ATD		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.5	4	8				46.6			(Template: MYWD)	
								45.1			0.0 - 4.7 ft: Silty SAND; Dusky red (5R3/4), minor Dark reddish brown (10R3/4) below 2.0', sand is fine grained, moderately sorted, minor gravel; roots between 0.0 - 0.7'; piece of red brick between 4.5 - 4.7'; firm, moist (Fill?).	Complete borehole number is B3890R421.
SS	2.0	1.4	15	15				44.6					Borehole sampled and gamma-logged by TMA/Eberline Corp.
								43.2				
SS	2.0	1.0	10	18				42.6				Augered to 4.0'.
								41.9				
								41.7				
								41.6	5		4.7 - 4.9 ft: Clayey SAND, (SC); Grayish black (N2) to Brownish black (5YR2/1), sand is fine grained, moderately sorted, slightly plastic, firm, moist.	
SS	2.0	1.9	18	20				40.6				Augered to 6.0'.
								40.2				
								39.9			4.9 - 6.7 ft: Clayey SAND, (SC); Light olive gray (5Y5/2) changing to Grayish green (5GY6/1) at 6.4', sand is fine grained, moderately well sorted, slightly plastic, firm, moist; layer of clean Sand, Pale brown (5YR5/2) to Moderate brown (5YR3/4), between 6.0 - 6.4'.	
SS	2.0	0.9	16	18				38.7				Augered to 8.0'.
								38.6				
								37.7				
								36.6	10		6.7 - 13.0 ft: Interlayered SAND and Sandy SILT, (SP); Moderate yellowish brown (10YR5/4) to Light brown (5YR5/6); sands are fine grained, with some very coarse sand layers present, some clayey layers between 6.7 - 7.9'; moderately well sorted between 6.7 - 8.9', well sorted clean sands below; firm, moist, wet below 10.0'.	
SS	2.0	1.3	12	5				35.3				Augered to 12.0'.
								35.3				
								34.6				
SS	2.0	1.2	18	19				33.6				Augered to total depth of 15.0'.
								33.4				3" PVC casing inserted to 14.5' for gamma-logging.
								31.6	15		13.0 - 13.2 ft: Gravelly SAND; Dark reddish brown (10R3/4), sand is medium grained, moderately sorted, gravel is subrounded to subangular.	PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 15.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE I-80 Westbound Right-of-Way	Last Update: 10-07-92	HOLE NO. R421
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GEOLOGIC DRILL LOG

PROJECT: FUSRAP
 JOB NO.: 14501
 SHEET NO.: 1 OF 1
 HOLE NO.: R422

SITE: I-80 Westbound Right-of-Way
 COORDINATES: N 2,417.0; E 3,964.0
 ANGLE FROM HORIZ: Vertical
 BEARING: -----

BEGUN: 12-13-90
 COMPLETED: 12-13-90
 DRILLER: Hydro Group, Inc.
 DRILL MAKE AND MODEL: Soil Sentry
 SIZE: 8"
 OVERBURDEN: 6.0
 ROCK (FT.): 0.0
 TOTAL DEPTH: 6.0

CORE RECOVERY (FT./%): 4.7/78*
 CORE BOXES: 0
 SAMPLES: 3
 EL. TOP CASING: NA
 GROUND EL.: 45.4
 DEPTH/EL. GROUND WATER: none ATD / NA
 DEPTH/EL. TOP OF ROCK: NA/NA

SAMPLE HAMMER WEIGHT/FALL: 140 lbs/30 in
 CASING LEFT IN HOLE: DIA./LENGTH: none
 LOGGED BY: Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE SLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
SS	2.0	1.4	6 6 5				45.4			0.0 - 2.2 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6) to Dark reddish brown (10R3/4), poorly sorted, roots between 0.0 - 0.7'; sedimentary clasts composed of Clayey Sand, Greenish gray (5GY6/1), below 2.0'; firm, moist.	Complete borehole number is B3890R422.
SS	2.0	1.4	4 4 8 8				44.0 43.4 43.2			2.2 - 4.3 ft: Clayey SILT, (ML); Grayish black (N2), some Light brown (5YR5/6) mottling below 4.0'; moderately plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.9	6 10 25 30				42.0 41.4 41.1 40.8			4.3 - 4.6 ft: Sandy CLAY, (CL); Greenish gray (5GY6/1) mottled with Light brown (5YR5/6), sand is fine grained, moderately plastic, firm, moist.	Augered to 4.0'.
							39.5 39.4			4.6 - 5.9 ft: SAND, (SW); Moderate brown (5YR4/4), fine to medium grained, moderately sorted, clean; minor sandstone gravel, subrounded; firm, moist; layer of Sandy Silt between 5.4 - 5.8'.	Augered to total depth of 6.0'. 3" PVC casing inserted to total depth for gamma-logging.
TOTAL DEPTH = 6.0 FT.											PVC casing was removed after logging; and hole was grouted to -3' below surface and remaining hole backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.
 Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.
 Description & classification by visual examination of sample.
 Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; 0 = OTHER
 SITE: I-80 Westbound Right-of-Way
 Last Update: 10-05-92
 HOLE NO.: R422



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO. 14501

SHEET NO. 1 OF 1

HOLE NO. R423

SITE
I-80 Westbound Right-of-Way

COORDINATES
N 2,022.0; E 3,832.0

ANGLE FROM HORIZ BEARING
Vertical -----

BEGUN 12-13-90
COMPLETED 12-13-90

DRILLER
Hydro Group, Inc.

DRILL MAKE AND MODEL
Soil Sentry

SIZE
8"

OVERBURDEN
14.4

ROCK (FT.)
0.0

TOTAL DEPTH
14.4

CORE RECOVERY (FT./%)
6.8/47*

CORE BOXES
0

SAMPLES
8

EL. TOP CASING
NA

GROUND EL.
47.3

DEPTH/EL. GROUND WATER
-10' ATD

DEPTH/EL. TOP OF ROCK
NA/NA

SAMPLE HAMMER WEIGHT/FALL
140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH
none

LOGGED BY:
Stephen Knuttel

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.2	3	14				47.3			0.0 - 1.2 ft: Sandy SILT to Silty SAND (ML-SM); Moderate brown (5YR3/4) changing to Moderate reddish brown (10R4/6) at 0.7'; sand is fine grained, moderately sorted; roots between 0.0 - 0.7'; firm, moist.	Complete borehole number is B3890R423.
SS	2.0	1.2	21	18				45.3			2.0 - 2.5 ft: Clayey SAND, (SC); Grayish black (N2) to Brownish black (5YR2/1), sand is fine grained, moderately sorted, slightly plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.5	10	11				43.3			2.5 - 6.6 ft: Silty to Clayey SAND, (SM-SC); Light brown (5YR5/6), mottled with Dark yellowish orange (10YR6/6) between 2.5 - 5.5', mottled with Pale yellowish orange (10YR8/6) below 6.0'; sand is fine grained, with some coarse grains; moderately sorted, firm, moist.	Augered to 4.0'.
SS	2.0	1.2	10	10				41.8	5			Augered to 6.0'.
SS	2.0	1.2	10	10				40.7				Augered to 6.0'.
SS	2.0	0.2	10	14				39.3				Augered to 8.0'.
SS	2.0	0.2	18	18				39.1				Augered to 10.0'.
SS	2.0	0.9	5	9				37.3	10			Augered to 12.0'.
SS	2.0	0.9	3	3				36.4				Augered to 14.0'.
SS	2.0	0.5	4	8				35.3				Spoon refusal at 14.4'.
SS	2.0	0.5	12	12				34.9				
SS	2.0	0.5	15	15				34.8				
SS	0.4	0.1	50/5*					33.3				3" PVC casing inserted to 14.0' for gamma-logging.
								33.2				PVC casing was removed after logging and hole was backfilled with drilling spoils.
								32.9				
TOTAL DEPTH = 14.4 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE
I-80 Westbound Right-of-Way

Last Update:
10-05-92

HOLE NO.
R423



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R424**

SITE: **I-80 Westbound Right-of-Way** COORDINATES: **N 2,042.0; E 3,837.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-13-90** COMPLETED: **12-13-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Soil Sentry** SIZE: **8"** OVERBURDEN: **8.0** ROCK (FT.): **0.0** TOTAL DEPTH: **8.0**

CORE RECOVERY (FT./%) **5.7/71*** CORE BOXES: **0** SAMPLES: **4** EL. TOP CASING: **NA** GROUND EL.: **46.5** DEPTH/EL. GROUND WATER: **NA** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	2.0	1.6	4	4				46.5					
			4					45.5					
			2					44.9					
SS	2.0	1.2	4	2				44.5					
			9					43.3					
			9					42.5					
SS	2.0	1.6	14	18				40.9	5				
			18					40.5					
SS	2.0	1.3	16	18				39.2					
			20					38.5					
			26										

(Template: MYWD)

0.0 - 1.0 ft: Gravelly, Silty SAND, (SM); Grayish brown (5YR3/2) to Moderate reddish brown (10R4/6), with debris.

1.0 - 1.6 ft: Clayey SILT, (ML); Black (N1) to Grayish black (N2), with fine roots and organics, moderately plastic, firm, moist.

2.0 - 3.2 ft: Silty SAND, (SM); Light brown (5YR5/6), moderately sorted; some sandy sedimentary clasts, Dark reddish brown (10R3/4); firm, moist.

4.0 - 7.3 ft: SAND, (SP); Moderate yellowish brown (10YR5/4) mottled with Light brown (5YR5/6) changing to Moderate brown (5YR4/4) at 6.0', very fine to fine grained, well sorted, clean below 6.0', finely layered, firm, moist.

TOTAL DEPTH = 8.0 FT.

Complete borehole number is B3890R424.

Borehole sampled and gamma-logged by TMA/Eberline Corp.

Augered to 6.0'.

Augered to total depth of 8.0'.

3" PVC casing inserted to total depth for gamma-logging.

PVC casing was removed after logging and hole was backfilled with drilling spoils.

* Core recovery refers to total soil & rock sample.

Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER SITE: **I-80 Westbound Right-of-Way** Last Update: **10-05-92** HOLE NO.: **R424**



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R425
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
I-80 Westbound Right-of-Way			N 2,062.0; E 3,841.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-13-90	12-13-90	Hydro Group, Inc.	Soil Sentry	8"	6.0	0.0	6.0			
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK				
3.0/50*	0	3	NA	45.8	↓ / none ATD ↓ / NA	NA/NA				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	0.5	5 6 12 7				45.8 45.3		0.0 - 0.5 ft: Silty SAND, (SM); Grayish brown (5YR3/2), with 0.3' sandstone fragment, Dark reddish brown (10R3/4) between 0.2 - 0.5'.	Complete borehole number is B3890R425.	
SS	2.0	1.0	8 12 15 15				43.8 43.3 42.8		2.0 - 2.5 ft: Clayey SAND, (SC); Grayish black (N2), sand is fine grained, moderately sorted, minor fine gravel and wood fragments, moderately plastic, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.5	18 18 20 20				41.8 40.3 39.8	5	2.5 - 3.0 ft: Clayey SAND, (SC); Light brown (5YR5/6) mottled with Light olive gray (5Y5/2), sand is fine grained, firm, moist. 4.0 - 5.5 ft: SAND, (SP); Dark yellowish brown (10YR4/2) mottled with Dark yellowish orange (10YR6/6) changing to Moderate brown (5YR4/4) at 4.2'; very fine to fine grained, moderately well sorted; silty between 4.0 - 4.2'; finely layered, firm, moist.	Augered to 4.0'. Augered to total depth of 6.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
TOTAL DEPTH = 6.0 FT.											

* Core recovery refers to total soil & rock sample.

Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	I-80 Westbound Right-of-Way	Last Update: 10-07-92	HOLE NO. R425
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
SITE				COORDINATES		14501	1 OF 1	R438			
I-80 Westbound-Right-of-Way				N 2,492.0; E 4,058.0		ANGLE FROM HORIZ		BEARING			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
1-14-91	1-14-91	Hydro Group, Inc.	Soil Sentry	8"	6.8	0.7	7.5				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.1/68*		0	4	NA	46.8	/ none ATD / NA		6.8/40.0			
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in			none		Stephen Knuttel <i>[Signature]</i>						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.3	3 4 14 15				46.8			0.0 - 1.3 ft: Silty SAND, (SM); Moderate brown (5YR4/4), sand is fine grained, moderately sorted; gravelly between 0.0 - 0.5', minor gravel below; minor roots, loose, moist.	Complete borehole number is B3890R416.
SS	2.0	0.9	5 8 10 12				44.8 44.4 43.9			2.0 - 2.4 ft: Sandy SILT, (ML); brownish black (5YR2/1), minor roots, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.7	11 25 26 40				42.8	5		2.4 - 6.8 ft: Silty SAND, (SM); Pale reddish brown (10R5/4), slightly mottled with Moderate reddish brown (10R3/4) below 4.0'; sand is very fine, moderately well sorted; minor gravel of mixed compositions, subangular, below 4.0'; slightly layered, firm, moist.	Augered to 4.0'.
SS	1.3	1.2	18 36 50/4"				41.1 40.8 40.0 39.6 38.3			6.8 - 7.2 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted; gravel is sandstone, angular, slightly weathered; firm, moist.	Augered to 6.0'.
TOTAL DEPTH = 7.5 FT.										Spoon refusal at 7.3'. Augered to total depth of 7.5'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
* Core recovery refers to total soil & rock sample.											
Coordinates and ground elevation surveyed by Niagara Boundry and Mapping Services L.S.P.C.											
Description & classification by visual examination of sample.											
Colors from "Rock-Color Chart" (GSA, 1948).											
SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		I-80 Westbound-Right-of-Way		Last Update: 10-08-92		HOLE NO. R438	



GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R587
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING		
Myron			N 9310.0; E 11120.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
11-18-90	11-18-90	Hydro Group, Inc.	Mobile B-80	8"	14.0	0.0	14.0				
CORE RECOVERY (FT./%)	CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK					
10.0/71*	0	7	NA	55.0	NA / none ATD	NA/NA					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in		none		Robert Cook <i>[Signature]</i>							

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
							55.0				(Template: MYWD)	
SS	1.5	1.4	21 28 49				54.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R587.
SS	0.7	0.6	36 50/2"				53.1 53.0 52.4				0.5 - 6.9 ft: FILL.	Augered through asphalt to 0.5'
											0.5 - 6.5 ft: Sandy Silt; Grayish brown (5YR3/2) with gravel and cement fragments; changing to Dusky yellowish brown (10YR2/2), silt -70-80%, sand -20-30%, no plasticity, at 4.0'; dry to moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.0	22 12 6 6				51.0 50.0	5			6.5 - 6.9 ft: Gravel, cinders and slag; Dusky yellowish brown (10YR2/2), very coarse grained, wet.	Spoon refusal at 2.7' Augered to 4.0'.
SS	2.0	2.0	1 1 4				49.0 48.1				6.9 - 7.8 ft: Clayey SILT, (ML); Olive black (5Y2/1), very fine grained, silt -80%, clay -20%, low plasticity, moist.	Augered to 6.0'.
SS	1.7	1.4	1 12 28 50/3"				47.2 46.3				7.8 - 8.7 ft: Silty CLAY, (CL); Moderate yellowish brown (10YR5/4), mottled; very fine grained, medium plasticity, moist.	Augered to 8.0'.
SS	2.0	1.9	7 15 18 22				45.6 45.0 44.6 44.1	10			8.7 - 10.9 ft: SAND, (SW - SP); Moderate brown (5YR4/4), very fine to fine grained, well graded becoming poorly graded at 10.4', moist.	Spoon refusal at 9.7' Augered to 10.0'.
SS	1.9	1.7	7 20 13 50/5"				43.1 43.0				10.9 - 13.7 ft: Sandy SILT interlayered with Sand, (ML-SW); Moderate yellowish brown (10YR5/4), silt -80-90%, very fine sand -10-20%; layers of Sand, Moderate brown (5YR4/4), fine to coarse grained, subrounded to rounded, poorly sorted, between 12.1 - 12.3' and 12.5 - 12.6'; no plasticity, moist.	Augered to 12.0'. Spoon refusal at 13.9'.
							41.3 41.0				TOTAL DEPTH = 14.0 FT.	Augered to total depth of 14.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R587
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GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R590
SITE			COORDINATES				ANGLE FROM HORIZ		BEARING		
Myron			N 9,385.0; E 11,120.0				Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-2-90	12-2-90	Hydro Group, Inc.	Soil Sentry		8"	7.0	3.0	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.3/63*		0	5	NA	56.0	- / - 8' ATD		7.0/9.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:							
140 lbs/30 in		none		Stephen Knuttel							

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
SS	2.0	1.4	35 44 27 20				56.0 55.8				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R590.
							54.6				0.2 - 4.2 ft: FILL.	
SS	2.0	1.5	30 27 20 30				54.0				0.2 - 3.0 ft: Sandy Gravel; Olive gray (5Y3/2) changing to Blackish red (5R2/2), loose to firm, slightly moist.	Sampled through asphalt with split spoon.
							52.5				3.0 - 4.2 ft: Silt and Slag; silt is Brownish black (5YR2/1), minor organics, slightly plastic, slightly moist; slag is Dark yellowish orange (10YR6/6), hard, silt to gravel-sized fragments.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	0.2	10 14 16 20				52.0 51.8					
							50.0	5			6.0 - 6.3 ft: Clayey SILT, (ML); Black (N1), slightly plastic, firm, slightly moist.	Augered to 6.0'.
SS	2.0	1.6	9 12 12 17				49.7 49.0				6.3 - 7.0 ft: Silty SAND, (SM); Light brown (5YR5/6), sand is fine grained, moderately sorted, firm, moist.	
SS	2.0	1.6	18 19 17 27				48.4 48.0				7.0 - 9.6 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted; gravel is sandstone, subrounded; firm, moist.	Augered to 8.0'.
							46.4 46.0	10			TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Myron	Last Update: 10-08-92	HOLE NO. R590
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GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
SITE			COORDINATES	14501	1 OF 1	R591
Myron			N 9414.0; E 1120.0	ANGLE FROM HORIZ		BEARING
BEGUN			DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN
12-2-90	COMPLETED	12-2-90	Hydro Group, Inc.	Mobile B-80	8"	6.7
ROCK (FT.)		TOTAL DEPTH				
3.3		10.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
7.3/73*		0	5	NA	57.0	none ATD
				DEPTH/EL. TOP OF ROCK		6.7/50.3
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Greg Pais		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS	CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
								57.0				(Template: MYWD)	
								56.8				0.0 - 0.2 ft: ASPHALT.	
SS	1.5	1.4	15					55.6				0.2 - 3.2 ft: FILL.	Complete borehole number is B3890R591.
			30					55.0				0.2 - 1.4 ft: Gravelly Silt; Dark reddish brown (10RS/4), with brick fragments, no plasticity, firm, dry.	Augered through asphalt to 0.5'.
SS	2.0	1.2	28					53.8				2.0 - 3.2 ft: Gravel, Grayish brown (5YR3/2), slag, concrete and brick fragments.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			23					53.0				4.0 - 6.7 ft: Clayey SILT, (ML); Dusky brown (5YR2/2), minor sand, moist.	Augered to 4.0'.
SS	2.0	1.6	10					51.4	5				
			3					51.0					
SS	2.0	1.7	9					50.3					Augered to 6.0'.
			16					49.3					
			23					49.0					Augered to 8.0'.
SS	1.4	1.4	23					47.6					
			26					47.0					
			50/5"						10				Spoon refusal at 9.4'.
TOTAL DEPTH = 10.0 FT.												Augered to total depth of 10.0'.	
												3" PVC casing inserted to 9.0' for gamma-logging.	
												PVC casing was removed after logging and hole was backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R591
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GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R592
SITE Myron		COORDINATES N 9445.0; E 11120.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 12-2-90	COMPLETED 12-2-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Soil Sentry	SIZE 8"	OVERBURDEN 5.0	ROCK (FT.) 3.0
CORE RECOVERY (FT./%) 4.7/59*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 57.0	DEPTH/EL. GROUND WATER NA / NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOBS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.2	15 15 18 16				57.0 56.8				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R592.
SS	2.0	0.9	10 5 5 4				55.8 55.0 54.4 54.1				0.2 - 2.6 ft: FILL. 0.2 - 2.3 ft: Silty Sand; Black (N2), with slag, loose, slightly moist. 2.3 - 2.6 ft: Silty Sand; Dark reddish brown (10R3/4), with sandstone gravel.	
SS	2.0	1.5	10 10 12 16				53.0 52.0 51.5 51.0				2.6 - 2.9 ft: Clayey SILT, (ML); Black (N1), plastic, soft, moist. 4.0 - 5.0 ft: SAND, (SW); Blackish red (5R2/2) to Moderate brown (5YR3/4), fine grained, moderately sorted, minor gravel, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
SS	1.8	1.1	20 17 30 50/3"				49.9 49.0				5.0 - 7.1 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly to moderately sorted, minor sandstone gravel, firm, moist.	Augered to 6.0'.
TOTAL DEPTH = 8.0 FT.											Spoon refusal at 7.8'. Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).												

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

Myron

Last Update: 03-19-92

HOLE NO. R592



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.	
SITE			COORDINATES	14501	1 OF 1	R593	
Myron			N 9470.0; E 1120.0	ANGLE FROM HORIZ		BEARING	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	
12-2-90	12-2-90	Hydro Group, Inc.	Mobile B-80	8"	6.0	2.0	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
6.1/76*		0	4	NA	57.5	∇ / none ATD ∇ / NA	6.0/51.5
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:			
140 lbs/30 in		none		Greg Pais <i>[Signature]</i>			

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS	G.P.M.	P.S.F.						
							TIME MIN.						
								57.5					
SS	1.5	1.2	17					57.3				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R593.
			18					56.8				0.2 - 0.7 ft: Gravelly SILT, (ML); Olive gray (5Y4/1).	
			14					56.3				0.7 - 2.9 ft: SILT, (ML); Dark reddish brown (10R3/4), minor clay and slag, no plasticity.	Augered through asphalt to 0.5'.
SS	2.0	1.8	12					55.5				2.9 - 5.7 ft: Sandy SILT, (ML); Moderate brown (5YR3/4) mottled with Moderate yellowish brown (10YR5/4), sand content increases with depth, nonplastic to slightly plastic with depth, dense, blocky, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.
			5					54.6					Augered to 4.0'.
			6					53.7					
SS	2.0	1.7	6					53.5					
			10					51.8					
			18					51.5					
			23										
SS	2.0	1.4	29										
			13										
			16										
			19										
								50.1					
								49.5					
TOTAL DEPTH = 8.0 FT.												Augered to total depth of 8.0'.	
												3" PVC casing inserted to 7.0' for gamma-logging.	
												PVC casing was removed after logging and hole was backfilled with drilling spoils.	
												* Core recovery refers to total soil & rock sample.	
												Ground elevation estimated from site topographic map.	
												Description & classification by visual examination of sample.	
												Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R593
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP		14501	1 OF 1	R594		
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Myron			N 9485.0; E 1120.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-2-90	12-2-90	Hydro Group, Inc.	Mobile B-80	8"	5.0	3.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.8/73*		0	4	NA	57.5	/ none ATD / NA		5.0/52.5		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Greg Pais					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.						TIME MIN.
SS	1.5	0.8	11 26 10			57.5 57.3 56.8 56.2 55.5			(Template: MYWD) 0.0 - 0.2 ft: ASPHALT. 0.2 - 0.7 ft: GRAVEL, (GP); Light olive gray (5Y5/2). 0.7 - 1.3 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4). 2.0 - 5.0 ft: SILT, (ML); Moderate brown (5YR3/4) mottled with Moderate yellowish brown (10YR5/4), locally gravelly, dense, slightly moist.	Complete borehole number is B3890R594. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
SS	2.0	1.7	6 9 10 17			53.8 53.5			5.0 - 7.5 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, poorly to moderately sorted, minor clay, firm, moist.	Augered to 6.0'.
SS	2.0	1.8	16 23 34 40			52.5	5			
SS	2.0	1.5	36 8 7 11			51.7 51.5				
						50.0 49.5				
TOTAL DEPTH = 8.0 FT.									Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER									* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SITE							Myron		Last Update: 03-19-92 HOLE NO. R594	



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R595
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Myron			N 9520.0; E 11120.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
12-2-90	12-2-90	Hydro Group, Inc.	Mobile B-80		8"	4.0	2.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.2/70*		0	3	NA	57.5	/ none ATD		4.0/53.5		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Greg Pais					

SAMP TYPE	SAMP. ADV. LEN	SAMP. REC. CORE REC.	SAMPLE BLOWS	RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
SS	1.5	1.0	48				57.5				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R695. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Augered to total depth of 6.0'. 3" PVC casing inserted to 5.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
			30				57.3				0.2 - 0.7 ft: Sandy GRAVEL, (GP); Olive gray (5Y4/1).		
			19				56.8						
SS	2.0	1.8	18				56.0				0.7 - 3.8 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), firm; layer of Clayey Silt, with imbedded slag, between 2.0 - 2.3'.		
			21				55.5						
			30				55.2						
			34										
SS	2.0	1.4	31				53.7				4.0 - 5.4 ft: Silty SAND, (SM); Dark reddish brown (10R3/4); sand is fine to medium grained, firm, moist.		
			34				53.5						
			29				52.1						
			31				51.5						
TOTAL DEPTH = 6.0 FT.													

SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R595
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R596

SITE

Myron

COORDINATES

N 9572.0; E 11120.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

12-2-90

COMPLETED

12-2-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

3.1

ROCK (FT.)

2.9

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

4.4/73*

CORE BOXES

SAMPLES

0

EL. TOP CASING

GROUND EL.

NA

DEPTH/EL. GROUND WATER

58.0 / none ATD

DEPTH/EL. TOP OF ROCK

3.1/55.1

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Greg Pais

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BL. OUTS. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.F.	TIME MIN.						
							58.0					
SS	1.5	1.0	30 44 27				57.8				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R596.
							56.8 56.5 56.0				0.2 - 1.2 ft: GRAVEL, (GP); Light olive gray (5Y5/2).	
SS	2.0	1.4	30 27 36 40				54.9 54.6 54.0				1.2 - 3.1 ft: SILT, (ML); Moderate brown (5YR3/4), minor clay and sand, slightly blocky structure, slightly moist.	Augered through asphalt to 0.5'.
SS	2.0	2.0	15 12 17 20				54.0	5			3.1 - 6.0 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, firm, moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
							52.0				TOTAL DEPTH = 6.0 FT.	Augered to total depth of 6.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

(Template: MYWD)

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Myron

Last Update: 03-19-92

HOLE NO.

R596



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R599
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Myron			N 9320.0; E 11200.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
12-2-90	12-2-90	Hydro Group, Inc.	Soil Sentry		8"	8.9	0.3	9.2		
CORE RECOVERY (FT./X)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
4.9/53*		0	5	NA	54.5	7 / none ATD NA / NA		8.9/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
							54.5			(Template: MYWD)	
SS	0.8	0.7	33 50/4"				54.3			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R599. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal at 0.8'. Augered to 2.0'. nr = not recorded; in-tact sediment recovery > interval driven indicated by driller. Spoon and auger refusal at 9.2'. 3" PVC casing inserted to 8.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
							53.3			0.2 - 6.8 ft: FILL. 0.2 - 3.0 ft: Sand, Gravel and Slag; Moderate brown (5YR3/4) to Grayish black (N2); slag pieces, White (N9) to Black (N1); mixed, particles range from medium to very coarse sand size, loose, slightly moist.	
SS	2.0	1.4	36 48 19 12				52.5				
							51.1				
SS	2.0	0.8	4 18 8 5				50.5			4.0 - 6.8 ft: Slag; Black (N2) to Moderate brown (5YR4/4), particle size increasing with depth from medium grained sand to gravel, moist, wet below 6.0'.	
							49.7	5			
SS	2.0	0.8	4 3 1/12"				48.5				
							47.7				
SS	1.2	1.2	nr 27 50/3"				46.5			8.0 - 8.9 ft: Clayey SAND, (SC); Black (N1) changing to Medium light gray (N6) at 8.7'; sand is very fine grained, well sorted, moderately sorted between 8.7 - 8.9'; moderately firm, moist.	
							45.6			8.9 - 9.2 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, poorly sorted, gravel is sandstone, firm, moist.	
							45.3				

TOTAL DEPTH = 9.2 FT.

SS = SPLIT SPOON; HQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R599
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GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R600
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Myron			N 9275.0; E 11300.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
12-2-90	12-2-90	Hydro Group, Inc.	Mobile B-80		8"	7.0	0.0	7.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
5.1/73%		0	4	NA	52.0	/ none ATD / NA		NA/NA		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Greg Pais <i>[Signature]</i>					

SAMP TYPE SAND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
								52.0				
								51.8			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R600. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 6.0'. Spoon refusal at 7.0'. Augered to total depth of 7.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	1.5	1.1	44					50.4			0.2 - 7.0 ft: FILL.	
			41					50.0			0.2 - 0.9 ft: Gravel.	
			18								0.9 - 1.6 ft: Clayey Silt; Dusky brown (5YR2/2).	
SS	2.0	1.4	11					48.6			2.0 - 3.4 ft: Clayey Silt interbedded with Sludge, Light gray (N7) between 2.0 - 2.5' and Dark olive gray (5Y3/2) between 2.5 - 3.5'; sludge is consistency of soft clayey silt.	
			12					48.0			4.0 - 5.6 ft: Silt; Moderate brown (5YR4/4), minor clay, sand, and slag, nonplastic to slightly plastic, moist.	
			15									
			17									
SS	2.0	1.6	7					46.4	5		6.0 - 7.0 ft: Gravel; concrete fragments, minor carbonaceous material, loose, slightly moist.	
			7					46.0				
			7									
			11									
SS	1.0	1.0	2-25					45.0			TOTAL DEPTH = 7.0 FT.	
			50/0"									

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; 0 = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R600
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R601

SITE

Myron

COORDINATES

N 9300.0; E 11400.0

ANGLE FROM HORIZ
Vertical

BEARING

BEGUN

12-2-90

COMPLETED

12-2-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.5

ROCK (FT.)

0.0

TOTAL DEPTH

4.5

CORE RECOVERY (FT./%)

3.4/76*

CORE BOXES

SAMPLES

EL. TOP CASING

GROUND EL.

DEPTH/EL. GROUND WATER

DEPTH/EL. TOP OF ROCK

0

3

NA

53.0

none ATD

NA/NA

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Greg Pais

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
							53.0			(Template: MYWD)	
SS	1.5	0.9	5 16 20				52.8			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R601. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon and auger refusal at 4.5'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
							51.6			0.2 - 7.0 ft: FILL.	
SS	2.0	1.5	21 39 33 34				51.0			0.2 - 0.5 ft: Gravel.	
							49.5			0.5 - 3.5 ft: Silt interbedded with Sludge, Yellowish gray (5Y7/2) to Dusky yellowish brown (10YR2/2); sludge is consistency of soft clayey silt; with wood, slag and brick fragments.	
SS	0.5	0.5	20-50/0*				49.0			4.0 - 4.5 ft: Gravel; concrete and brick fragments.	
							48.5			TOTAL DEPTH = 4.5 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Myron

Last Update:
03-19-92

HOLE NO.
R601



GEOLOGIC DRILL LOG				PROJECT			JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP			14501	1 OF 1	R602		
SITE				COORDINATES				ANGLE FROM HORIZ	BEARING		
Myron				N 9325.0; E 11495.0				Vertical	-----		
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
12-2-90	12-2-90	Hydro Group, Inc.		SoilENTRY		8"	14.0	0.0	14.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
6.0/43*		0	7	NA	54.0	-13' ATD / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Stephen Knuttel						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.					
SS	2.0	1.5	35 37 36 48			54.0 53.8			0.0 - 0.2 ft: ASPHALT. 0.2 - 8.3 ft: FILL.	Complete borehole number is B3890R602.	
SS	2.0	1.2	27 26 23 48			52.5 52.0			0.2 - 1.5 ft: Sand, gravel and slag; various shades of brown and gray, with cement fragments.	Augered through asphalt to 0.2'	
SS	2.0	0.1	4 16 12 9			50.7 50.0 49.9			2.0 - 2.6 ft: Sand; Moderate brown (5YR4/4), medium grained, poorly sorted, loose, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	0.4	2 3 1/12"			48.0 47.6	5		2.6 - 4.1 ft: Sandy Gravel; Dark gray (N3), loose, slightly moist.		
SS	2.0	1.2	2 4 5 5			46.0 45.7 45.2 44.8			6.0 - 8.3 ft: Sludge, White (N9), silty to clayey, consistency of chalky paste, soft, wet.	Augered to 8.0'.	
SS	2.0	0.6	6 7 6 9			44.0 43.4	10		8.3 - 8.8 ft: Organic SILT, (OL); Brownish black (5YR2/1), moderately firm, moist. 8.8 - 9.2 ft: Silty CLAY, (CL); Black (N1), moderately plastic, moderately firm, moist.	Augered to 10.0'.	
SS	2.0	1.0	27 25 30 27			42.0 41.8 41.3 41.0			10.0 - 10.6 ft: SAND, (SW); Black (N1) changing to Grayish brown (5YR3/2) at 10.2'; fine to medium grained, moderately sorted, moist to wet.	Augered to 12.0'.	
						42.0 41.8 41.0			12.0 - 12.2 ft: SAND, (SP); Grayish black (N2), fine grained, moderately well sorted, firm, moist.	Augered to total depth of 14.0'.	
						41.0 40.0			12.2 - 12.7 ft: Clayey SAND, (SC); Pale brown (5YR5/2), sand is fine grained, moderately well sorted, firm, moist.	3" PVC casing inserted to 12.0' for gamma-logging.	
									12.7 - 13.0 ft: SAND, (SP); Black (N1), fine grained, well sorted, minor silt, moderately firm, wet.	PVC casing was removed after logging and hole was backfilled with drilling spoils.	
TOTAL DEPTH = 14.0 FT.											
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>											
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE			Myron		Last Update: 03-19-92	HOLE NO. R602	



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R603**

SITE: **Myron** COORDINATES: **N 9275.0; E 11600.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-2-90** COMPLETED: **12-2-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **16.0** ROCK (FT.): **0.0** TOTAL DEPTH: **16.0**

CORE RECOVERY (FT./%) **8.8/55*** CORE BOXES: **0** SAMPLES: **8** EL. TOP CASING: **NA** GROUND EL.: **51.5** DEPTH/EL. GROUND WATER: **NA / none ATD** DEPTH/EL. TOP OF ROCK: **NA/NA**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Greg Pais**

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
							51.5			(Template: MYWD)	
SS	1.5	1.0	19 20 16				51.8 50.0			0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 8.6 ft: FILL. 0.5 - 1.5 ft: Silt; Dark reddish brown (10R3/4).	Complete borehole number is B3890R603.
SS	1.8	1.7	12 14 21 50/4"				49.5			2.0 - 6.3 ft: Gravel; brick and concrete rubble, matrix of silt and clay.	Augered through asphalt to 0.5' Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.9	0.5	38 3 4 50/5"				47.8 47.5 47.0	5			Spoon refusal at 3.8' Augered to 4.0'
SS	2.0	1.7	3 4 3 4				45.5			6.3 - 7.5 ft: Sludge, Yellowish gray (5Y7/2), silty to clayey, consistency of chalky paste, soft, wet.	Spoon refusal at 5.9' Augered to 6.0'
SS	2.0	0.6	7 2 5 17				43.8 43.5 42.9			7.5 - 8.6 ft: Gravel; brick and concrete rubble, debris, matrix of organic silt and clay.	Augered to 8.0' Augered to 10.0'
SS	1.0	1.0	45 50/6"				41.5	10		10.0 - 10.8 ft: SAND, (SW); Black, fine to medium grained, organic, moist.	Spoon refusal at 11.0' Augered to 12.0'
							40.7 40.5			10.8 - 11.0 ft: Silty SAND, (SM); Moderate brown (5YR3/4), sand is medium grained, well sorted, moist.	Augered to 14.0'
SS	2.0	0.4	14 21 33 32				39.5 39.1			12.0 - 15.9 ft: Clayey SILT, (ML); Olive gray (5Y3/2), organic, homogeneous, slightly plastic, firm, moist.	Augered to total depth of 16.0' 3" PVC casing inserted to 15.0' for gamma-logging.
SS	2.0	1.9	4 23 15 12				37.5	15			PVC casing was removed after logging and hole was backfilled with drilling spoils.
							35.6 35.5			TOTAL DEPTH = 16.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Myron** Last Update: **03-19-92** HOLE NO.: **R603**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
SITE										COORDINATES		ANGLE FROM HORIZ	BEARING	
Myron										N 9304.0; E 11403.0		Vertical	-----	
BEGUN	COMPLETED	DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
12-2-90	12-2-90	Hydro Group, Inc.			Mobile B-80		8"	6.0	0.0	6.0				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK						
0.0/0*		0	0	NA	52.5	/ none ATD / NA		NA/NA						
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in			none			Greg Pais								
SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	CORE RECOVERY	LOSS IN G.P.M	WATER PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
								52.5 52.3				(Template: MYWD)		
									5			0.0 - 0.2 ft: ASPHALT. 0.2 - 6.0 ft: FILL; (material similar to Hole R601) Gravel, silt and sludge; sludge is Yellowish gray (5Y7/2) to Dusky yellowish brown (10YR2/2), consistency of soft clayey silt; with wood, slag and brick fragments.	Complete borehole number is B3890R604. Augered through asphalt to 6.0'. NOTE: attempted to drill hole directly to 6.0' to continue sampling in area below 6.0'; hole is -5' northeast of Hole R601.	
SS	0.0	0.0	50/0*					46.5				TOTAL DEPTH = 6.0 FT.	Spoon refusal at 6.0' 3" PVC casing inserted to 5.0' for gamma-logging. Borehole gamma-logged by TMA/Eberline Corp. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
													* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER										SITE		Myron	Last Update: 03-19-92	HOLE NO. R604



GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R605
SITE Myron		COORDINATES N 9610.0; E 10955.0			ANGLE FROM HORIZ Vertical	BEARING -----
BEGUN 12-2-90	COMPLETED 12-2-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Soil Sentry	SIZE 8"	OVERBURDEN 4.0	ROCK (FT.) 4.0
CORE RECOVERY (FT./%) 3.8/48*		CORE BOXES 0	SAMPLES 4	EL. TOP CASING NA	GROUND EL. 60.5	DEPTH/EL. GROUND WATER NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Stephen Knuttel		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS	G.P.H.	PRESS. P.S.F.						TIME MIN.
SS	1.8	0.3	7/4" 8 7 4				60.5 60.3		0.0 - 0.2 ft: ASPHALT. 0.2 - 0.5 ft: Sandy GRAVEL, (GW); Moderate brown (5YR4/4) to Dark reddish brown (10R3/4).	Complete borehole number is B3890R605.	
SS	2.0	1.3	8 8 7 12				58.5 57.2		2.0 - 3.3 ft: SAND, (SW); Moderate reddish brown (10R4/6), fine grained, moderately sorted, moderately firm, slightly moist.	Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.2	4 6 7 5				56.5 55.3	5	4.0 - 7.0 ft: Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine grained, moderately sorted, minor angular sandstone gravel, firm, moist.		
SS	2.0	1.0	12 12 19 19				54.5 53.5				
							52.5		TOTAL DEPTH = 8.0 FT.	Augered to total depth of 8.0'. 3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Myron	Last Update: 03-19-82	HOLE NO. R605
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R606

SITE

Myron

COORDINATES

N 9620.0; E 11050.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-2-90

COMPLETED

12-2-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Soil Sentry

SIZE

8"

OVERBURDEN

2.0

ROCK (FT.)

4.9

TOTAL DEPTH

6.9

CORE RECOVERY (FT./%)

2.8/41*

CORE BOXES

SAMPLES

EL. TOP CASING

NA

GROUND EL.

60.0

DEPTH/EL. GROUND WATER

Y / none ATD

Z / NA

DEPTH/EL. TOP OF ROCK

2.0/58.0

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Stephen Knuttel

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOMS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: MYMD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.					
							60.0				
SS	1.8	1.1	10/4" 7 5 14				59.8			0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R606. Augered through asphalt to 0.2'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Sampled to 6.0'. Augered to total depth of 6.9'; auger refusal. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	2.0	0.9	6 7 23 26				58.7			0.2 - 1.3 ft: Silty SAND (SM); Moderate reddish brown (10R4/6), sand is fine grained, poorly sorted, minor roots, firm, moist.	
							58.0				
SS	2.0	0.8	16 17 26 29				57.1			2.0 - 4.8 ft: Gravelly SAND (SW); Dark reddish brown (10R3/4); sand is fine grained, moderately sorted; gravel is sandstone, angular, fractured; firm, moist; changing to Sandstone, weathered, blocky, iron-oxide cement, interlayered with fine sand, at 4.0'.	
							56.0				
							55.2	5			
							53.1				
TOTAL DEPTH = 6.9 FT.											

SS = SPLIT SPOON; HQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Myron

Last Update:
03-19-92

HOLE NO.
R606



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO. **14501** SHEET NO. **1 OF 1** HOLE NO. **R607**

SITE: **Myron** COORDINATES: **N 9350.0; E 11290.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-9-90** COMPLETED: **12-9-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Soil Sentry** SIZE: **8"** OVERBURDEN: **8.0** ROCK (FT.): **4.0** TOTAL DEPTH: **12.0**

CORE RECOVERY (FT./%): **5.3/44*** CORE BOXES: **0** SAMPLES: **6** EL. TOP CASING: **NA** GROUND EL.: **50.5** DEPTH/EL. GROUND WATER: **7 / -9' ATD** DEPTH/EL. TOP OF ROCK: **8.0/42.5**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Stephen Knuttel**

SAMP. AND DIA.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE LOSS CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.						
							50.5					
SS	1.5	0.7	15 15 14				50.3				0.0 - 0.2 ft: ASPHALT.	Complete borehole number is B3890R607. Augered through asphalt to 0.5' Borehole sampled and gamma-logged by TMA/Eberline Corp. Spoon refusal 6.9' Augered to 8.0'. Augered to 10.0'. Spoon refusal 11.6' Augered to total depth of 12.0'. 3" PVC casing inserted to 11.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
							49.2				0.2 - 2.7 ft: FILL.	
SS	2.0	0.9	6 7 6 7				48.5				0.2 - 0.9 ft: Sand and Gravel; Moderate brown (5YR3/4) to Grayish black (N2).	
							47.8				0.9 - 1.3 ft: Slag; Black (N1); coal, very coarse sand to fine gravel-sized particles; changing to Dark yellowish brown (10YR4/2), medium to very coarse sand-sized particles, at 1.2'; loose, slightly moist.	
SS	2.0	1.5	7 15 20 25				46.5				2.0 - 2.7 ft: Gravelly, Sandy SILT, (ML); Moderate reddish brown (10R4/6), gravel is of mixed composition, mostly sandstone, firm, moist.	
							45.6	5				
							45.0				2.7 - 4.9 ft: Sandy, Silty CLAY, (CL); Grayish red (10R4/2) changing to Grayish orange (10YR7/4) mottled with Light brown (5YR5/6) at 4.0', sandy below 4.0', moderately plastic, moderately firm, moist.	
SS	0.9	0.6	25 50/5"				44.5				4.9 - 6.6 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), sand is fine to medium grained, moderately sorted, firm, slightly moist.	
							43.9					
SS	2.0	0.6	14 14 15 15				42.5				6.6 - 8.0 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, gravel is sandstone, firm, moist.	
							41.7					
SS	1.8	1.0	7 15 25 50/1"				40.5	10				
							39.5					
							38.5					
TOTAL DEPTH = 12.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; SITE: **Myron** Last Update: **03-19-92** HOLE NO. **R607**
 HX = HAND AUGER; O = OTHER



GEOLOGIC DRILL LOG

PROJECT: **FUSRAP** JOB NO.: **14501** SHEET NO.: **1 OF 1** HOLE NO.: **R608**

SITE: **Myron** COORDINATES: **N 9300.0; E 11700.0** ANGLE FROM HORIZ: **Vertical** BEARING: **-----**

BEGUN: **12-9-90** COMPLETED: **12-9-90** DRILLER: **Hydro Group, Inc.** DRILL MAKE AND MODEL: **Mobile B-80** SIZE: **8"** OVERBURDEN: **9.1** ROCK (FT.): **2.9** TOTAL DEPTH: **12.0**

CORE RECOVERY (FT./%) **8.6/72*** CORE BOXES: **0** SAMPLES: **6** EL. TOP CASING: **NA** GROUND EL.: **50.0** DEPTH/EL. GROUND WATER: **none ATD** DEPTH/EL. TOP OF ROCK: **9.1/40.9**

SAMPLE HAMMER WEIGHT/FALL: **140 lbs/30 in** CASING LEFT IN HOLE: DIA./LENGTH: **none** LOGGED BY: **Robert Cook**

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	LOSS G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
							50.0			(Template: MYWD)	
SS	1.5	0.9	16 27 17				49.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R608.
SS	2.0	1.4	5 5 5				48.6 47.7			0.5 - 2.3 ft: FILL; Olive gray (5Y4/1), sand -40%, silt -30%, gravel -30%, minor glass between 2.0 - 2.3'.	Augered through asphalt to 0.5'
SS	2.0	1.4	2 3 8 7				48.0 47.7 46.6 46.0 45.3			2.3 - 4.7 ft: CLAY, (CL); Very pale orange (10YR8/2), very fine grained, low plasticity, wet.	Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
SS	2.0	2.0	6 9 18 20				44.6 44.0 43.6	5		4.7 - 6.4 ft: Clayey SILT, (ML); Dark yellowish orange (10YR6/6) mixed with Dusky yellowish brown (10YR2/2) and Very pale orange (10YR8/2), very fine to fine grained, silt -60 - 80%, clay -20%; medium grained sand -40% between 4.7 - 4.9'; low plasticity, moist to wet.	Augered to 6.0'.
SS	2.0	1.3	19 36 35 50				40.9 40.7 40.0			6.4 - 9.1 ft: Silty CLAY, (CL); Dark yellowish brown (10YR4/2), mottled; fine grained, clay -70%, silt -30%, low plasticity, moist.	Augered to 8.0'.
SS	2.0	1.6	25 31 28 50				38.4 38.0	10		9.1 - 11.6 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, iron-oxide cement, blocky, weathered.	Augered to 10.0'.
TOTAL DEPTH = 12.0 FT.										Augered to total depth of 12.0'. 3" PVC casing inserted to 11.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
										* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE: **Myron** Last Update: **03-19-92** HOLE NO.: **R608**



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
				FUSRAP		14501	1 OF 1	R609	
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING	
Myron			N 9340.0; E 11630.0			Vertical		-----	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH	
12-9-90	12-9-90	Hydro Group, Inc.	Soil Sentry		8"	9.0	3.5	12.5	
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
7.4/59*		0	7	NA	53.0	-7' ATD		9.0/44.0	
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:					
140 lbs/30 in		none		Stephen Knuttel					
				(Template: MYWD)					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / 2' CORE RECOVERY	WATER TESTS		ELEV.		DEPTH	
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.		GRAPHICS	
								SAMPLE	
								DESCRIPTION AND CLASSIFICATION	
								NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
SS	1.5	0.9	10 4 3				53.0 52.8 52.4	0.0 - 0.6 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R609.
SS	2.0	1.7	2 3 4				51.5 51.0	0.6 - 5.1 ft: FILL; Sludge, White (N9) to Very light gray (N8) changing to Very pale orange (10YR8/2), silty to clayey, chalky to cottony, soft, wet.	Augered through asphalt to 0.5' Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.3	5 4 2 2				49.3 49.0		
SS	2.0	1.5	3 5 8 15				47.9 47.7 47.0	5.1 - 8.2 ft: Organic, Silty CLAY, (OH); Black (N1) to Grayish Black (N2), with roots, varying plasticity, thinly layered between 6.8 - 7.5', moderately firm to firm, moist.	Augered to 6.0'. Augered to 8.0'.
SS	1.4	1.2	15 17 50/5*				45.5 45.0 44.8 44.3 44.0 43.8	8.2 - 8.7 ft: SILT, (ML); Moderate yellowish brown (10YR5/4), minor very fine grained sand, no plasticity, firm, moist.	Spoon refusal 9.4'
SS	1.4	0.6	11 25 50/5*				43.0 42.4	8.7 - 9.0 ft: Organic, Silty CLAY, (OH); Grayish Black (N2), with roots, moderately plastic, moderately firm, moist.	Augered to 10.0'. Spoon refusal at 11.4'.
SS	0.5	0.2	50/6*				41.0 40.8 40.5	9.0 - 12.2 ft: Silty SAND, (SM); Blackish red (5R2/2), sand is fine to medium grained, poorly sorted; minor subangular sandstone gravel between 10.0 - 10.6'; firm, moist; changing to Sandstone, Dark reddish brown (10R3/4), fine to medium grained, iron-oxide cement, blocky, weathered, at 12.0'.	Augered to 12.0'. Spoon refusal at 12.5'. Augered to total depth of 12.5'. 3" PVC casing inserted to 10.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
TOTAL DEPTH = 12.5 FT.									
* Core recovery refers to total soil & rock sample.									
Ground elevation estimated from site topographic map.									
Description & classification by visual examination of sample.									
Colors from "Rock-Color Chart" (GSA, 1948).									
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER			SITE			Myron		Last Update: 03-19-92	HOLE NO. R609



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R610
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Myron			N 9400.0; E 11700.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-9-90	12-9-90	Hydro Group, Inc.	Mobile B-80	8"	6.3	3.7	10.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK			
7.3/73*		0	5	NA	53.0	7 / none ATD NA	6.3/47			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:						
140 lbs/30 in		none		Robert Cook						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
							53.0				(Template: NYWD)	
SS	1.5	1.1	19 0 6				52.8 52.0 51.4 51.0				0.0 - 0.5 ft: ASPHALT; over sand and gravel. 0.5 - 1.0 ft: FILL; Olive gray (5Y4/1), silt and gravel. 1.0 - 4.5 ft: SILT, (ML); Very pale orange (10YR8/2), very fine grained, silt -90%, clay -10%, no plasticity, moist.	Complete borehole number is B3890R610. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Augered to 6.0'. Augered to 8.0'.
SS	2.0	1.9	4 7 8 8				49.1 49.0 48.5 47.7	5			4.5 - 6.3 ft: Clayey SILT, (ML); Moderate brown (5YR4/4), fine grained, silt -60%, clay -40%, low plasticity, moist.	
SS	2.0	1.4	9 12 23 27				47.0 46.7				6.3 - 9.6 ft: Gravelly, Clayey SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, silt -60%, clay -30%, minor sandstone gravel, no plasticity, moist.	
SS	2.0	1.6	25 32 35 33				45.6 45.0					
							43.4 43.0	10			TOTAL DEPTH = 10.0 FT.	Augered to total depth of 10.0'. 3" PVC casing inserted to 9.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.

SS = SPLIT SPOON; MQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R610
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GEOLOGIC DRILL LOG

PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R611
SITE	Myron	COORDINATES	N 9400.0; E 11602.0		ANGLE FROM HORIZ	Vertical	
BEGUN	12-9-90	COMPLETED	12-9-90	DRILLER	Hydro Group, Inc.	DRILL MAKE AND MODEL	Soil Sentry
				SIZE	8"	OVERBURDEN	11.1
CORE RECOVERY (FT./%)	5.1/43*	CORE BOXES	0	SAMPLES	6	EL. TOP CASING	NA
				GROUND EL.	54.0	DEPTH/EL. GROUND WATER	7' / - 8' ATD
SAMPLE HAMMER WEIGHT/FALL	140 lbs/30 in	CASING LEFT IN HOLE: DIA./LENGTH	none		LOGGED BY:	Stephen Knuttel	

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.						
SS	1.5	0.3	11				54.0				0.0 - 0.9 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R611.	
SS	2.0	1.0	4				53.8				2.0 - 4.6 ft: FILL; Sludge, White (N9); piece of liner material, cloth, at -2.5'; sludge is consistency of Silty Clay, chalky, soft, wet.	Augered through asphalt to 0.5'	
SS	2.0	0.6	1/12"				53.1					Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.2	3				52.0						
SS	2.0	0.6	5				51.0						
SS	2.0	1.4	7				50.0						
SS	2.0	0.6	1				49.4	5					
SS	2.0	1.2	8				48.0				6.0 - 6.4 ft: Organic, Silty CLAY, (OH); Black (N1), soft, wet.	Augered to 6.0'.	
SS	2.0	0.6	8				47.6				6.4 - 7.0 ft: CLAY, (CL); Grayish Black (N2), thinly layered, plastic, firm, moist.		
SS	2.0	0.6	21				47.0				7.0 - 7.2 ft: Silty, Gravelly SAND, (SM); Dark reddish brown (10R3/4), sand is medium grained, poorly sorted, firm, moist.		
SS	2.0	0.6	5				46.8				8.0 - 8.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4) to Moderate reddish brown (10R4/6), sand is fine to medium grained, moderately sorted, moderately firm, moist.		
SS	2.0	1.4	20				46.0				10.0 - 10.6 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2); sand is very fine grained, firm, moist.	Augered to 10.0'.	
SS	2.0	1.4	25				45.4				10.6 - 11.1 ft: Clayey SAND, (SC); Black (N1), sand is very fine grained, well sorted, firm, moist.	Augered to total depth of 12.0'.	
			7				44.0	10			11.1 - 11.4 ft: SANDSTONE; Dark reddish brown (10R3/4), medium grained, iron-oxide cement, blocky, weathered.	3" PVC casing inserted to 9.5' for gamma-logging.	
			11				43.4					PVC casing was removed after logging and hole was backfilled with drilling spoils.	
			15				42.9						
			25				42.6						
							42.0						
TOTAL DEPTH = 12.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER

SITE	Myron	Last Update:	03-19-92	HOLE NO.	R611
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GEOLOGIC DRILL LOG			PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R612	
SITE Myron		COORDINATES N 9550.0; E 11560.0			ANGLE FROM HORIZ Vertical	BEARING -----	
BEGUN 12-9-90	COMPLETED 12-9-90	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Mobile B-80	SIZE 8"	OVERBURDEN 5.5	ROCK (FT.) 1.7	
CORE RECOVERY (FT./%) 3.6/50*		CORE BOXES 0	SAMPLES 5	EL. TOP CASING NA	GROUND EL. 55.0	DEPTH/EL. GROUND WATER NA	TOTAL DEPTH 7.2
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none		LOGGED BY: Robert Cook			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLDS. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.T.	TIME MIN.						
							55.0				(Template: MYWD)	
SS	1.5	1.3	20 21 22				54.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R612. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Augered to 6.0'. Spoon refusal at 6.2'. Augered to 7.0'. Spoon refusal at 7.2'. 3" PVC casing inserted to 6.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
							53.2 53.0 52.8				0.5 - 4.2 ft: FILL. 0.5 - 2.2 ft: Sand, silt, gravel and brick fragments; Moderate brown (5YR3/4).	
SS	2.0	0.2	17 10 12 10				51.0				4.0 - 4.2 ft: Sludge, White (N9) interlayered with Dark gray (N5), silty to clayey, chalky, soft, wet.	
SS	2.0	1.6	3 3 4 20				50.8				4.2 - 5.5 ft: Clayey SILT, (ML); Light brown (5YR5/6), silt -70%, clay, -30%, low plasticity, wet.	
SS	0.2	0.2	50/3*				49.5 49.4 49.0 48.8 48.0 47.8				5.5 - 7.2 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, iron-oxide cement, blocky, weathered.	
SS	0.2	0.2	50/3*								TOTAL DEPTH = 7.2 FT.	

SS = SPLIT SPOON; NO = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE Myron	Last Update: 03-19-92	HOLE NO. R612
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.
14501

SHEET NO.
1 OF 1

HOLE NO.
R613

SITE

Myron

COORDINATES

N 9650.0; E 11535.0

ANGLE FROM HORIZ
Vertical

BEGUN

12-9-90

COMPLETED

12-9-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

2.7

ROCK (FT.)

1.3

TOTAL DEPTH

4.0

CORE RECOVERY (FT./%)

2.9/73*

CORE BOXES

0

SAMPLES

2

EL. TOP CASING

NA

GROUND EL.

56.0

DEPTH/EL. GROUND WATER

↓ / none ATD
↓ / NA

DEPTH/EL. TOP OF ROCK

2.7/53

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYLD)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	1.5	1.2	18 20 26				56.0 55.8 54.9				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R613. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to total depth of 4.0'. 3" PVC casing inserted to 3.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
SS	2.0	1.7	16 9 11 14				54.3 54.0 53.3				0.5 - 1.1 ft: FILL; Olive gray (5Y4/1), silt, sand and gravel.	
							52.3 52.0				1.1 - 2.7 ft: Clayey SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, silt -80%, clay -20%, no plasticity, moist.	
											2.7 - 3.7 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, iron-oxide cement, blocky, weathered.	
TOTAL DEPTH = 4.0 FT.												

SS = SPLIT SPOON; NQ = CORE BARREL; SITE
HX = HAND AUGER; O = OTHER

Myron

Last Update: 03-19-92

HOLE NO. R613



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 1	R614			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
Myron			N 9700.0; E 11500.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-9-90	12-9-90	Hydro Group, Inc.	Mobile B-80		8"	6.8	1.2	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
5.1/64*		0	4	NA	56.5	none ATD NA		6.8/49.7			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.							TIME MIN.	(Template: MYWD)
						56.5					
SS	1.5	0.8	21 24 7			56.3				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R614.
SS	2.0	0.7	5 5 6 3			55.2				0.5 - 4.6 ft: Sandy to Clayey SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, silt -60-70%, clay <5-20%, sand -10-40%, no plasticity, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	2.0	1.6	7 8 8 3			54.5				4.6 - 6.5 ft: GRAVEL, (GW); Dark reddish brown (10R3/4), sandstone gravel with fine to medium grained sand.	Augered to 4.0'.
SS	2.0	2.0	2 3 6 13			53.8				6.5 - 6.8 ft: Sandy SILT, (ML); Light brown (5YR5/6), very fine grained, silt -60%, sand -40%, no plasticity, moist.	Augered to 6.0'.
						52.5				6.8 - 8.0 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4), fine to medium grained, silt -60%, sand -20%, clay -20%, no plasticity, moist.	Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.
						51.9				TOTAL DEPTH = 8.0 FT.	
						50.9					
						50.5					
						50.0					
						49.7					
						48.5					
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE		Myron		Last Update: 03-19-92		HOLE NO. R614	



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. R615				
SITE Myron			COORDINATES N 9753.0; E 11598.0			ANGLE FROM HORIZ Vertical		BEARING -----				
BEGUN 12-9-90	COMPLETED 12-9-90	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Soil Sentry	SIZE 8"	OVERBURDEN 4.0	ROCK (FT.) 1.0	TOTAL DEPTH 5.0				
CORE RECOVERY (FT./%) 2.4/48*		CORE BOXES 0	SAMPLES 3	EL. TOP CASING NA	GROUND EL. 58.0	DEPTH/EL. GROUND WATER none ATD		DEPTH/EL. TOP OF ROCK 4.0/54				
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: Stephen Knuttel							
(Template: MYWD)												
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	1.5	0.7	21 17 21				58.0 57.8			0.0 - 1.3 ft: ASPHALT; over sand and gravel.		Complete borehole number is B3890R615.
SS	2.0	1.6	12 15 25 33				56.7 56.0			2.0 - 3.6 ft: SAND, (SW); Moderate reddish brown (10R4/6), fine to medium grained, moderately sorted, locally silty, loose to moderately firm with increased silt content, moist.		Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	0.5	0.1	48-50/0*				54.4 54.0 53.9 53.0			4.0 - 4.1 ft: SAND, (SW); Dark reddish brown (10R3/4), fine to medium grained, moderately sorted, firm, moist.		Spoon refusal at 4.5'. Auger refusal at 5.0'. 3" PVC casing inserted to 3.0' for gamma-logging.
										TOTAL DEPTH = 5.0 FT.		PVC casing was removed after logging and hole was backfilled with drilling spoils.
												* Core recovery referz: to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE Myron		Last Update: 03-19-92		HOLE NO. R615				



GEOLOGIC DRILL LOG				PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 1	HOLE NO.	R616
SITE			COORDINATES			ANGLE FROM HORIZ			BEARING		
Myron			N 9758.0; E 11365.0			Vertical			-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-9-90	12-9-90	Hydro Group, Inc.	Mobile B-80		8"	8.0	0.0	8.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
4.8/60°		0	4	NA	58.5	none ATD NA / NA		NA/NA			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			Robert Cook						

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								58.5				(Template: MYMD)	
SS	1.5	0.2	12	9				58.2				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R616. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Augered to 6.0'. Augered to total depth of 8.0'. 3" PVC casing inserted to 7.5' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
			6					57.8				0.5 - 2.7 ft: FILL. 0.5 - 0.7 ft: Sandy Silt; Moderate brown (5YR3/4), fine to medium grained.	
SS	2.0	1.5	3	3				56.5				2.0 - 2.7 ft: Sludge, White (N9) interlayered with Light gray (N7), clayey to silty, chalky, soft wet.	
			5					55.8				2.7 - 4.4 ft: Clayey SILT, (ML); Dark yellowish brown (10YR4/2), very fine to fine grained, silt -70%, clay, -30%, low plasticity, moist.	
SS	2.0	1.8	4	10				55.0				4.4 - 7.5 ft: Sandy SILT, (ML); Moderate reddish brown (10R4/8), very fine to medium grained, silt -70%, sand -20%, clay -10%, no plasticity, moist.	
			13	14				54.5					
SS	2.0	1.5	9	14				52.9					
			13	17				52.5					
								51.0					
								50.5					
TOTAL DEPTH = 8.0 FT.													

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Myron	Last Update:	03-19-92	HOLE NO.	R616
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GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
				FUSRAP		14501	1 OF 1	R617				
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING				
Myron			N 9810.0; E 11470.0			Vertical		-----				
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
12-9-90	12-9-90	Hydro Group, Inc.		Soil Sentry		8"	8.0	0.5	8.5			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
4.7/55*		0	5	NA	61.0	/ none ATD / NA		8.0/53.0				
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:							
140 lbs/30 in		none			Stephen Knuttel							
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME MIN.						
							61.0			(Template: MYWD)		
SS	1.5	0.9	3 7 10				60.8 60.5			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R617.	
SS	2.0	1.5	3 5 15 20				59.5 59.0			0.5 - 1.5 ft: FILL. 0.5 - 0.8 ft: Gravelly Sand; Moderate brown (5YR3/4), fine to medium grained; with layer of Sludge, White (N9), silty, chalky, dry to slightly moist, between 0.8 - 1.1'.		Augered through asphalt to 0.5'.
SS	2.0	1.0	10 18 18 16				57.5 57.0 56.6			2.0 - 4.4 ft: SAND, (SW); Light brown (5YR5/6) to Moderate brown (5YR4/4), fine to medium grained, poorly sorted, moderately firm, slightly moist.	Borehole sampled and gamma-logged by TMA/Eberline Corp.	
SS	2.0	1.0	8 9 9 10				56.0 55.0	5		4.4 - 7.0 ft: Silty SAND, (SM); Moderate reddish brown (10R4/6), sand is fine grained grading with depth to medium grained, moderately to moderately well sorted, moist.		
SS	2.0	1.0					54.0					
SS	0.4	0.3	60/5"				53.0 52.7 52.5			8.0 - 8.3 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, iron-oxide cement, blocky, weathered.	Augered to 8.0'. Spoon refusal at 8.4'. Auger refusal at 8.5'. 3" PVC casing inserted to 8.5' for gamma-logging.	
										TOTAL DEPTH = 8.5 FT.	PVC casing was removed after logging and hole was backfilled with drilling spoils.	
<p>* Core recovery refers to total soil & rock sample.</p> <p>Ground elevation estimated from site topographic map.</p> <p>Description & classification by visual examination of sample.</p> <p>Colors from "Rock-Color Chart" (GSA, 1948).</p>												
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER				SITE				Myron		Last Update: 03-19-92		HOLE NO. R617



GEOLOGIC DRILL LOG										PROJECT		JOB NO.		SHEET NO.		HOLE NO.	
SITE										COORDINATES				ANGLE FROM HORIZ		BEARING	
Myron										N 9813.0; E 11357.0				Vertical		-----	
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE		OVERBURDEN		ROCK (FT.)		TOTAL DEPTH			
12-9-90		12-9-90		Hydro Group, Inc.		Mobile B-80		8"		7.6		0.4		8.0			
CORE RECOVERY (FT./%)			CORE BOXES		SAMPLES		EL. TOP CASING		GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK				
6.2/78*			0		5		NA		59.0		7 / none ATD 7 / NA		7.6/51.4				
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:									
140 lbs/30 in				none				Robert Cook									
										(Template: MYWD)							
										DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.					
										0.0 - 0.5 ft: ASPHALT; over sand and gravel.		Complete borehole number is B3890R618.					
										0.5 - 2.3 ft: FILL.		Augered through asphalt to 0.5'.					
										0.5 - 0.6 ft: Sandy Silt; Moderate brown (5YR5/4), fine to medium grained.		Borehole sampled and gamma-logged by TMA/Eberline Corp.					
										0.6 - 2.3 ft: Sludge, Light bluish gray (5B7/1), clayey to silty, low plasticity, moist.		Augered to 4.0'.					
										2.3 - 7.6 ft: Sandy SILT, (ML); Moderate yellowish brown (10YR5/4) changing to Moderate reddish brown (10R4/6) with mottling at 5.4', fine to medium grained, silt -60%, sand, -40%, no plasticity, moist.		Augered to 6.0'.					
										7.6 - 8.0 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, iron-oxide cement, blocky, weathered.		Augered to total depth of 8.0'.					
										TOTAL DEPTH = 8.0 FT.		3" PVC casing inserted to 7.5' for gamma-logging.					
												PVC casing was removed after logging and hole was backfilled with drilling spoils.					
												* Core recovery refers to total soil & rock sample.					
												Ground elevation estimated from site topographic map.					
												Description & classification by visual examination of sample.					
												Colors from "Rock-Color Chart" (GSA, 1948).					
SS = SPLIT SPOON; NQ = CORE BARREL; SITE										Myron		Last Update: 03-19-92		HOLE NO. R618			
HX = HAND AUGER; O = OTHER																	



GEOLOGIC DRILL LOG			PROJECT	JOB NO.	SHEET NO.	HOLE NO.
			FUSRAP	14501	1 OF 1	R619
SITE		COORDINATES			ANGLE FROM HORIZ	
Myron		N 9660.0; E 11368.0			Vertical	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)
12-9-90	12-9-90	Hydro Group, Inc.	Mobile B-80	8"	6.0	1.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER
5.1/73"		0	4	NA	56.0	7 / none ATD NA
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH		LOGGED BY:		
140 lbs/30 in		none		Robert Cook		

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
								56.0				(Template: MYWD)	
SS	1.5	1.0	20	10				55.8				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R619.
			11					54.5				0.5 - 2.4 ft: FILL; Grayish black (N2), coal, brick fragments, cinders, slag.	
SS	2.0	1.8	5	3				54.0				2.4 - 5.8 ft: Sandy SILT, (ML); Dark yellowish brown (10YR4/2), fine to medium grained, silt -70%, sand, -20%, clay -10%, low plasticity; changing to Moderate reddish brown (10R4/6), silt -60%, sand -40%, gravelly and coarser grained with depth, no plasticity; moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'.
			9					53.6					
SS	2.0	1.8	11	23				52.5					
			20					52.0					
			22										
SS	0.5	0.5	60/6"					50.2				6.0 - 6.5 ft: SANDSTONE interlayered with Sandy SILT; Dark reddish brown (10R3/4); fine to medium grained, iron-oxide cement, blocky, weathered.	Augered to 6.0'. Spoon refusal at 6.5'. Augered to total depth of 7.0'.
								50.0					
								49.5					
								49.0					
TOTAL DEPTH = 7.0 FT.												PVC casing was removed after logging and hole was backfilled with drilling spoils.	

* Core recovery refers to total soil & rock sample.

Ground elevation estimated from site topographic map.

Description & classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R619
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GEOLOGIC DRILL LOG				PROJECT	JOB NO.	SHEET NO.	HOLE NO.
				FUSRAP	14501	1 OF 1	R620
SITE			COORDINATES			ANGLE FROM HORIZ BEARING	
Myron			N 9650.0; E 11253.0			Vertical	
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
12-9-90	12-9-90	Hydro Group, Inc.	Soil Sentry	8"	4.9	3.1	8.0
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER	DEPTH/EL. TOP OF ROCK
4.3/54*		0	4	NA	58.5	none ATD NA	4.9/53.6
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:		
140 lbs/30 in		none			Stephen Knuttel		

SAMP. AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLONS % CORE RECOVERY	LOSS G.P.M.	WATER PRESS. P.S.I.	TEMP. MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
							58.5				(Template: MYWD)	
							58.3				0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R620. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.5	1.0	11 10 15				58.0				0.5 - 2.9 ft: FILL; Silty, Sandy Gravel, Blackish red (10R2/2); with cement fragments between 1.2 - 1.5'; firm, moist.	
SS	2.0	0.9	7 11 12 14				57.0					
							56.5					
							55.6					
SS	2.0	1.3	4 7 12 15				54.5				4.0 - 4.9 ft: Sandy SILT (ML); Moderate reddish brown (10R4/6), moderately firm, moist.	
							53.6					
							53.2					
SS	2.0	1.1	20 15 13 48				52.5				4.9 - 7.1 ft: Gravelly, Silty SAND (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted; gravel is sandstone, content decreases with depth; firm, moist.	
							51.4					
							50.5					
TOTAL DEPTH = 8.0 FT.											Augered to total depth of 8.0'. 3" PVC casing inserted to 7.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	

SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER	SITE	Myron	Last Update: 03-19-92	HOLE NO. R620
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R621

SITE

Myron

COORDINATES

N 9646.0; E 11157.0

ANGLE FROM HORIZ BEARING

Vertical

BEGUN

12-9-90

COMPLETED

12-9-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.0

ROCK (FT.)

3.1

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

2.0/75*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

62.0

DEPTH/EL. GROUND WATER

∇ / none ATD
NA

DEPTH/EL. TOP OF ROCK

4.0/58

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLK. CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					PRESS. P.S.I.	TIME MIN.					
							62.0			(Template: MYWD)	
SS	1.5	1.0	14 10 5				61.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R621. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Spoon refusal at 5.9'. Augered to total depth of 6.0'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
							60.7			0.5 - 1.3 ft: FILL; cinders and slag, Very light gray (N8) to Light gray (N7).	
SS	2.0	1.8	15 19 15 21				60.5 60.0			1.3 - 3.8 ft: Sandy SILT, (ML); Moderate brown (5YR4/4) changing to Moderate reddish brown (10R4/6) at 2.9', fine to medium grained, silt -70%, sand, -20%, clay -10%, no plasticity, moist.	
SS	1.9	1.7	15 17 26 50/5*				58.2 58.0			4.0 - 5.7 ft: SANDSTONE interlayered with Sandy SILT; Dark reddish brown (10RS/4), fine to medium grained, iron-oxide cement, blocky, weathered.	
							56.3 56.0			TOTAL DEPTH = 6.0 FT.	

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Myron

Last Update:
03-19-92

HOLE NO.

R621



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.		
				FUSRAP		14501	1 OF 1	C622		
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
Myron			N 9473.0; E 11115.0			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
12-9-90	12-9-90	Hydro Group, Inc.	Soil Sentry		8"	4.0	2.0	6.0		
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
3.5/58*		0	3	NA	59.0	7 / none ATD NA		4.0/55		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		none			Stephen Knuttel					
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS % CORE RECOVERY	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.						TIME IN MIN.	(Template: MYWD)
						59.0				
SS	1.5	1.2	9 8			58.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890C622.
SS	2.0	0.9	7 11 12 14			57.3 57.0			0.5 - 1.7 ft: FILL; Gravelly, Silty Sand, Blackish red (6R2/2) to Moderate reddish brown (10R4/6); Slag, Black (N1), up to -1 cm present; sand is fine grained, poorly sorted, firm, moist.	Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp.
SS	1.9	1.4	14 15 18 50/5"			56.1 55.0			2.0 - 2.9 ft: Silty SAND, (SM); Grayish black (N2), sand is fine grained, moderately sorted, firm, moist.	Augered to 4.0'.
						53.6 53.0	5		4.0 - 5.4 ft: Gravelly, Silty SAND, (SM); Dark reddish brown (10R3/4), sand is fine to medium grained, moderately sorted, firm, moist.	Spoon refusal at 5.9'. Augered to total depth of 6.0'.
TOTAL DEPTH = 6.0 FT.									3" PVC casing inserted to total depth for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils.	
SS = SPLIT SPOON; NQ = CORE BARREL; HX = HAND AUGER; O = OTHER									* Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SITE						Myron		Last Update: 03-19-92	HOLE NO. C622	



GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 1

HOLE NO.

R623

SITE

Myron

COORDINATES

N 9620.0; E 11195.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

12-9-90

COMPLETED

12-9-90

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Mobile B-80

SIZE

8"

OVERBURDEN

4.0

ROCK (FT.)

2.0

TOTAL DEPTH

6.0

CORE RECOVERY (FT./%)

4.2/70*

CORE BOXES

0

SAMPLES

3

EL. TOP CASING

NA

GROUND EL.

58.0

DEPTH/EL. GROUND WATER

↓ / none ATD
↓ / NA

DEPTH/EL. TOP OF ROCK

4.0/5'

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

Robert Cook

(Template: MYWD)

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					P.S.I.	TIME MIN.					
			9 19 24				58.0 57.8 57.8			0.0 - 0.5 ft: ASPHALT; over sand and gravel.	Complete borehole number is B3890R623. Augered through asphalt to 0.5'. Borehole sampled and gamma-logged by TMA/Eberline Corp. Augered to 4.0'. Augered to total depth of 6.0'. 3" PVC casing inserted to 5.0' for gamma-logging. PVC casing was removed after logging and hole was backfilled with drilling spoils. * Core recovery refers to total soil & rock sample. Ground elevation estimated from site topographic map. Description & classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).
SS	1.5	1.3					56.5 56.2 56.0			0.5 - 1.5 ft: FILL; gravel, sand and silt, Olive gray (5Y4/1) to Moderate brown (5YR3/4).	
SS	2.0	1.6	13 14 15 16				54.4 54.0			1.5 - 3.6 ft: Sandy SILT, (ML); Dark reddish brown (10R3/4) stained with Dark yellowish orange (10YR6/6) between 3.3 - 3.6', fine to medium grained, silt -60%, sand, -30%, clay -10%, no plasticity, moist to wet below 3.3'.	
SS	2.0	1.3	23 21 20 19				52.7 52.0	5		4.0 - 5.3 ft: SANDSTONE; Dark reddish brown (10R3/4), fine to medium grained, iron-oxide cement, blocky, weathered, moist.	
TOTAL DEPTH = 6.0 FT.											

SS = SPLIT SPOON; NQ = CORE BARREL;
HX = HAND AUGER; O = OTHER

SITE

Myron

Last Update: 03-19-92

HOLE NO.

R623

APPENDIX G

Field Investigation Report on the Smoke Test
of Sewer Lines at MISS

TRIP REPORT	PROJECT: FUSRAP	JOB NUMBER: 14501	DATE(S) OF TRIP: 2/4 - 2/7/91
TRAVELER(S) NAME AND POSITION: ▶ Ken Myers - Engineer ▶ George Crawford - Engineer Jack Blanke - Geologist <i>JMB</i>			
TRIP TO / PURPOSE: Perform a smoke test of sewer lines at the MISS site.			
PERSONS CONTACTED: Don Downing Robert Horvath			
RESULTS (USE ADDITIONAL PAGE IF NECESSARY): (see attachment)			
FOLLOWUP ACTION NEEDED (IDENTIFY ANY SPECIFIC COMMITMENTS): (see attachment)			
PREPARED BY (NAME): George A. Crawford	SIGNATURE: ▶ X <i>George A. Crawford</i>	LOCATION: 7th Floor	DATE: 2/14/91
DISTRIBUTION: J. Darby J. Blanke K. Myers J. Beck M. Redmon R. Robertson G. Atchinson			

FIELD INVESTIGATION REPORT
ON THE
SMOKE TEST OF
SEWER LINES AT MISS

On February 5 and 6, 1991 a smoke test of the Maywood on-site drainage/sewer lines was performed per Instruction Guide 138-IG-008. The following is the results of the test. Note that the numbers and letters of the manholes and lines refer to Figure 1.

It is known from previous investigations that manholes 1, 7 and 12, and subsequently lines A and K, are part of Westerly Brook. Line E is also part of Westerly Brook. The lines are 6½ ft. diameter pre-cast concrete (ref. CCN 70748). Manhole 12 has not been found above ground and is suspected to be buried. Its location on Figure 1 is approximate.

It was determined from the smoke test that manholes 2 and 6 are connected by line B, which is a 36 in. corrugated steel pipe at manhole 2 and a 36 in. concrete pipe at manhole 6.

Manhole 5 is connected to manhole 6 by an 18 in. clay pipe which is labelled as line C. Manhole 4 is filled with rubble, making smoke egress impossible. However, the construction of manholes 4 and 5 is similar (brick and mortar), therefore it is suspected that they are connected as represented by line M.

Line D is a 36 in. concrete pipe extending in the direction of manhole 8, which is welded shut, and beyond to a headwall on the far side of State Route 17. Smoke was also seen further along the path of Westerly Brook, indicating a connection to line E beyond the headwall. Smoke was also observed coming up from a drop inlet on State Route 17, so it is suspected that there is a connection back to manhole 8, as shown by line L.

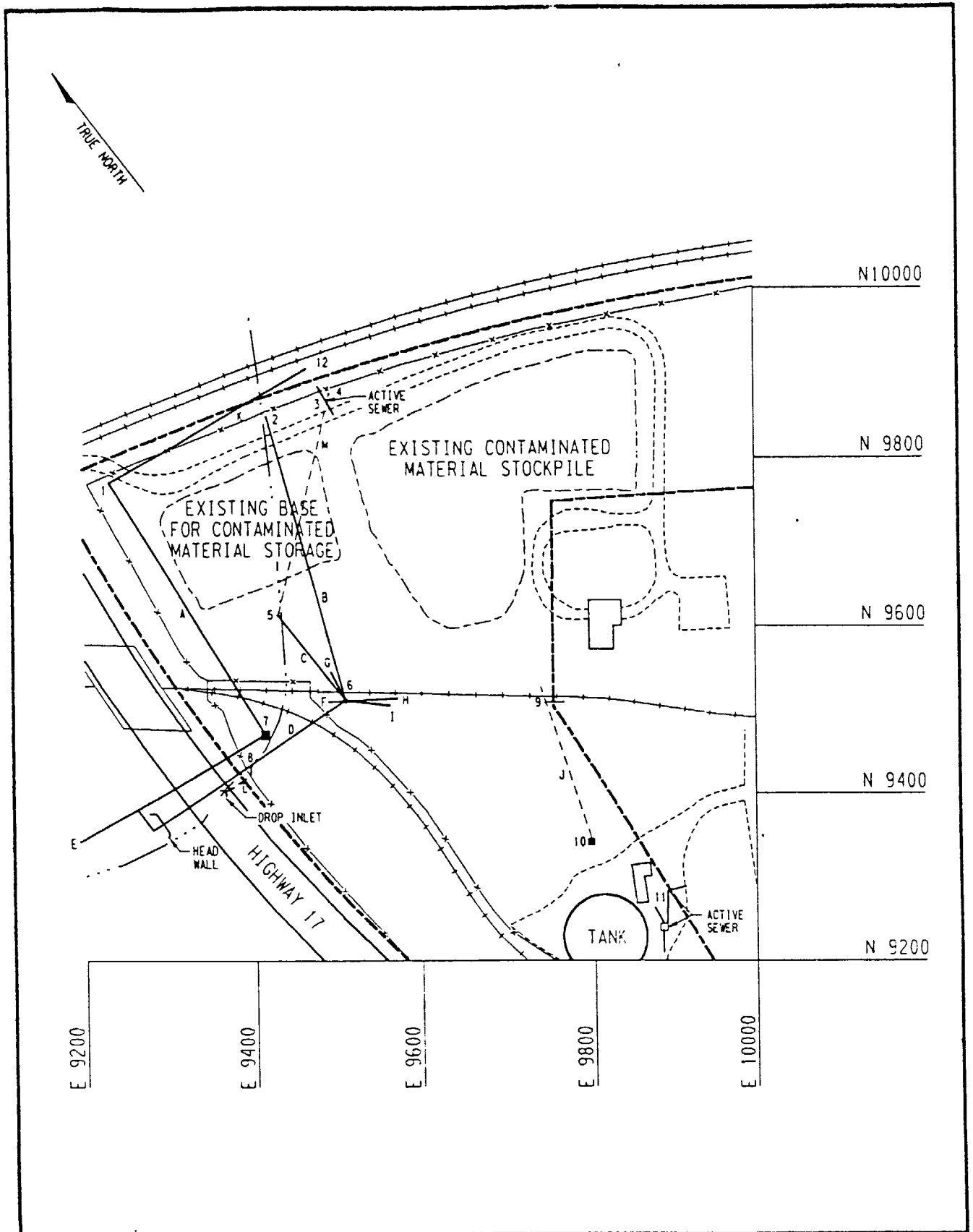
Four other pipes issue from manhole 6. Line F is an 8 in. clay pipe that is visibly blocked at about 2 feet in, and therefore was not tested. Line G is an 8 in. clay pipe that did not have any visible smoke exits when tested. Lines H and I are 12 in. concrete pipes for which no smoke exits could be found. It can be concluded that lines G, H and I are also blocked.

No smoke exits could be seen for manhole 9, though some water was flowing through it in the direction of manhole 10. The lines through which water was flowing are 6 in. clay pipes. It is suspected that manholes 9 and 10 are connected by line J, due to the direction of the pipes issuing from the manholes and the approximately equal volume of water flowing into each. The inlet for the line leading into manhole 9 was not found. Another 4 in. iron pipe issues from manhole 9, but is apparently blocked.

Manholes 3 and 11 are part of an active sewer system and were not tested.

Based on the results of the investigation, the following recommendations can be made:

1. The welds on manhole 8 should be removed to allow the cover to be removed to allow verification of the link to the drop inlet on State Route 17.
2. The suspected connection between manholes 9 and 10 should be verified by a dye test.



138F070.DGN

FIGURE 1 SEWER/DRAINAGE LINES AT MISS

APPENDIX H

**Metals and Rare Earth Concentrations
in Groundwater**

Table H-1
Dissolved and Total Metal Concentrations* in Groundwater

Quarter, 1990		Ag	Al	As	B	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Tl	V	Zn	
mping	Total/																										
ation*	Dissolved																										
SS-1B	Total	4.0UJ	113U	2.0U	100U	23.4B	1.0U	18900	4.0U	7.0U	4.0U	5.0U	3310J	8470	119	9860	117J	100U	50800	10.0U	3.0UJ	25.2J	3.8	40.0UJ	10.9B	12.0B	
SS-1B	Dissolved	4.0UJ	113UJ	2.0U	100U	17.9B	1.0U	16300	4.0U	7.0U	4.0U	5.0UJ	51.0UJ	7420	121	8970	60.8J	100U	49000	10.0U	3.0UJ	22.0UJ	2.8	4.0UJ	10.6B	7.4B	
SS-2A	Total	4.0UJ	376	2310	100U	26.5	1.0U	152000	4.0U	7.0U	274	80.4	2720	11300	100U	11700	118	100U	1050000	15.7B	3.0R	22.0U	20.0UJ	40.0U	19.9B	40.8	
SS-2A	Dissolved	4.0UJ	2010	2350	100U	18.8B	1.0U	161000	4.0U	7.0U	365	109	3920	11400	100U	12300	147	100U	1000000	17.7B	10.8J	22.0U	4.5J	4.0UJ	19.4B	23.3	
SS-2B	Total	4.0UJ	113U	20.0UJ	3240	10.0U	1.0U	231000U	4.0U	7.0U	9.4B	5.0U	14900	63100	15700	55200	2570	100U	21200	11.5B	30.0UJ	22.5B	20.0UJ	40.0UJ	7.9B	30.6	
SS-2B	Dissolved	4.0UJ	113U	20.0UJ	3200	10.0U	1.0U	222000	4.0U	7.0U	11.6	5.0U	637	61100	15900	53500	2450	100U	21300	10.4B	3.4J	22.0U	20.0UJ	40.0UJ	6.0U	144	
ISS-3A	Total	4.0UJ	1970	R	102	105B	1.0U	37600	4.0U	11.0B	4.0U	7.1B	99700	24500	213	4970B	1140	100U	235	10.0U	3.0UJ	22.0U	20.0UJ	40.0UJ	6.0U	5.4B	
ISS-3A	Dissolved	4.0UJ	113U	2.0UJ	100U	40.1B	1.0U	42100	4.0U	7.0U	4.0U	5.0U	97300	28000	225	5080	1260	100U	27100	10.0U	3.0UJ	22.0U	2.0UJ	4.0UJ	6.0U	33.1	
ISS-3B	Total	4.0U	113U	4.2J	100U	10.0U	1.0U	81400	4.0U	8.8B	4.0U	5.0U	36300	6890	118	3700	2740	100U	62000	10.0U	3.0UJ	22.0U	2.0UJ	4.0UJ	6.0U	18.0B	
ISS-3B	Dissolved	4.0UJ	113U	20.0UJ	100U	10.0U	1.0U	79700	4.0U	7.0U	4.0U	5.0U	12400	6420	100U	3630B	2570	100U	62800	10.0U	3.0UJ	22.0U	2.0UJ	4.0UJ	6.0U	258	
ISS-4A	Total	4.0UJ	55000	4.2J	117	466	4.5B	60700	4.0U	36.7B	7.17	81.3	85000	38600	100U	21900	3330	100U	44700	59.9	389J	22.0U	2.0UJ	4.0UJ	10.3B	147	
ISS-4A	Dissolved	4.0UJ	2310	2.0UJ	174	122B	1.0B	60000	4.0U	9.5B	8.7B	26.6	3860	36700	100U	13500	3130	100U	45900	21.3B	8.8J	22.0U	2.0UJ	4.0UJ	6.0U	12.6	
ISS-4B	Total	4.0UJ	113U	2.0UJ	175	27.2B	1.0U	58600	4.0U	7.0U	5.3B	5.0U	35100	32800	100U	10500	1130	100U	1000000	10.0U	3.0UJ	22.0U	2.0UJ	4.0UJ	6.0U	36.6	
ISS-4B	Dissolved	4.0UJ	113U	2.0UJ	100U	113B	1.0U	55800	4.0U	7.0U	4.0U	5.0U	13500	29500	100U	9850	1330	100U	94200	10.0U	3.0UJ	22.0U	2.0UJ	4.0UJ	6.0U	56.5	
ISS-5A	Total	4.0UJ	113U	2.0UJ	581	62.1B	2.9B	647000	4.0U	7.0U	4.0U	8.4B	101000	83700	940	69400	873	100U	18500	13.9B	17.8J	22.0U	2.0UJ	4.0UJ	11.8B	28.8	
ISS-5A	Dissolved	4.0UJ	113U	2.0UJ	688	31.3B	1.0U	673000	4.0U	7.0U	4.0U	5.0U	983	88100	959	72500	810	100U	18660	10.0U	3.0UJ	22.0U	2.0UJ	4.0UJ	6.0U	46.3	
ISS-5B	Total	4.0UJ	113U	2.0UJ	553	15.2	1.0U	74200	4.0U	7.0U	5.7	5.0U	51.0U	322000	2070	18400	360	100U	132000	10.0U	3.0UJ	22.0U	2.0UJ	4.0UJ	6.0U	16.4	
ISS-5B	Dissolved	4.0UJ	113U	2.0UJ	581	154B	1.0U	263000	6.0J	7.0U	14.1	35B	26000	48100	100U	14400	468	100U	48700	23.1B	79.4J	22.0U	8.2J	4.0UJ	19.8B	1610	
ISS-6A	Total	4.0UJ	5330	3.8	100U	64.2B	1.0U	269000	4.0U	7.0U	4.0U	31.3	51.0U	49300	100U	14000	370	100U	50500	12.4B	3.0R	22.0U	2.0UJ	4.0UJ	6.0U	66.6	
ISS-6A	Dissolved	4.0UJ	113U	2.0U	100U	64.2B	1.0U	68200	4.0U	7.0U	4.0U	5.0U	5280	115000	17400	8800	1490	100U	418000	10.0U	3.0U	22.0U	2.0UJ	40.0UJ	6.0U	32.0	
ISS-6B	Total	4.0UJ	318	9.7	1840	40.7B	1.0U	61100	4.0U	7.0U	4.0U	5.0U	156	115000	16700	8390	1220	100U	411000	10.0U	3.0UJ	22.0U	2.0UJ	40.0UJ	6.0U	32.0	
ISS-6B	Dissolved	4.0UJ	113U	9.0B	1820	40.7B	1.0U	61100	4.0U	7.0U	4.0U	5.0U	156	115000	16700	8390	1220	100U	411000	10.0U	3.0UJ	22.0U	2.0UJ	40.0UJ	6.0U	32.0	
ISS-7A*																											
ISS-7A	Total	10U	200U	94.8	554	200U	5.0U	24,800	5.0U	50.0U	10.0U	25.0U	27,100	20,100	2940	16,500	388	100U	751,000	40.0U	3.0U	60.0U	5.0U	100U	50.0U	25.1	
ISS-7B	Dissolved	10U	200U	10.0U	576	200U	5.0U	22,800	5.0U	50.0U	10.0U	25.0U	100U	19,000	1000	15,900	102	100U	745,000	40.0U	3.0U	60.0U	5.0U	100U	50.0U	100	
ISS-7B	Total	10U	200U	10.0U	166	200U	5.0U	349,000	5.0U	50.0U	10.0U	25.0U	30,400	26,500	1000	47,100	7760	100U	187,000	40.0U	3.0U	60.0U	5.0U	100U	50.0U	20.0U	
ISS-7B	Dissolved	10U	200U	10.0U	146	200U	5.0U	385,000	5.0U	50.0U	10.0U	25.0U	26,400	27,500	1000	51,900	8130	100U	179,000	40.0U	3.0U	60.0U	5.0U	100U	50.0U	20.0U	
ISS-7B	Total	10U	200U	10.0U	1690	339	5.0U	89,900	5.0U	50.0U	10.0U	25.0U	32,500	5000U	2780	9060	9600	111	100U	73,900	40.0U	10.8	60.0U	5.0U	100U	50.0U	20.0U
ISS-7B	Dissolved	10U	200U	10.0U	1770	200U	1.0U	102,000	5U	50U	10U	25U	2990	5000U	100U	10600	10,300	100U	83,800	40U	3.0U	60.0U	5.0U	10U	50U	20U	
ISS-7B	Total	10.0U	200U	10.0U	178	200	5.0U	153,000	5.0U	50.0U	10.0U	25.0U	14,900	13,400	503	12,700	2630	100U	111,000	40.0U	3.0U	60.0U	5.0U	10.0U	50.0U	20.0U	
ISS-7B	Dissolved	10.0U	200U	10.0U	210	200U	5.0U	181,000	5.0U	50.0U	10.0U	25.0U	19,400	16,200	100U	15,100	2960	100U	126,000	40.0U	3.0U	60.0U	5.0U	10.0U	50.0U	48.7	
ISS-7B	Total	10.0U	232	10.0U	118	200U	5.0U	45,600	5.0U	50.0U	10.0U	25.0U	535	9560	100U	5000	2210	100U	28,800	40.0U	3.2	60.0U	5.0U	10.0U	50.0U	41.3	
ISS-7B	Dissolved	10U	200U	10.0U	160	200U	5.0U	54,800	5.0U	50.0U	10.0U	25.0U	100U	11,200	100U	5000	1560	100U	33,200	40.0U	3.0U	60.0U	5.0U	10.0U	50.0U	116J	
ISS-7B	Total	4.0UJ	3580J	7.7J	100U	161B	1.0U	7540000	4.0U	13.8B	9.1B	20.1B	10300	6120	100U	12500J	1340	100U	2600J	15.9B	3.0UJ	25.4B	2.9J	4.0UJ	29.2B	116J	
ISS-7B	Dissolved	4.0UJ	113UJ	5.9J	100U	27.1B	1.0U	647000J	4.0U	7.0U	4.0U	5.0U	2740	2600B	100U	9890J	1100	100U	22400J	10.7B	3.0UJ	22.0U	2.5J	4.0UJ	24.1B	52.5J	
ISS-7B	Total	4.0UJ	115J	2.0UJ	100U	101B	1.0U	107000J	4.0U	7.0U	8.2B	7.7B	1110	2510B	100U	23100J	89.2	100U	23400J	11.2B	3.5J	23.4B	2.3J	4.0UJ	6.0U	63.8J	
ISS-7B	Dissolved	4.0UJ	113UJ	2.0UJ	100U	91.9B	1.0U	103000J	4.0U	7.0U	4.0U	5.0U	66.3B	2190B	100U	22600J	26.3	100U	23100J	10.0U	3.0UJ	22.0U	2.0U	4.0UJ	6.0U	58.2J	
ISS-7B	Total	10U	942	10U	687	200U	5.0U	436,000	5.0U	50.0U	10.0U	25.0U	28,500	68,600	3540	31,800	2540	100U	126,000	10U	3.0U	60U	5.0U	10.0U	50.0U	31.9	
ISS-7B	Dissolved	10U	200U	10.0U	160	200U	5.0U	479,000	5.0U	50.0U	10.0U	25.0U	24,500	94,100	3440	32,300	2610	100U	134,600	40U	3.0U	60U	5.0U	10.0U	50.0U	80.4	
ISS-7B	Total	10U	200U	10.0U	100U	190B	1.0U	87500	4.0U	47.9B	443	91.4	12300J	5480	100U	25800	227	100U	16300	16.9B	3.0U	22.0U	2.0UJ	40.0UJ	35.1B	73.0	
ISS-7B	Dissolved	4.0UJ	1730J	12.0J	100U	83.9B	1.0U	88300	4.0U	7.0U	4.0U	5.1B	51.0U	4880B	100U	8200	68.2	100U	18100	13.7B	42.5	22.0U	2.0UJ	4.0UJ	30.5B	176	
ISS-7B	Total	4.0UJ	113U	2.5J	100U	57.5B	1.0U	53900	4.0U	7.0U	11.1	101	1800J	30100	100U	8200	68.2	100U	18200	10.0U	3.7	22.0U	2.0UJ	4.0UJ	29.1B	55.5	
ISS-7B	Dissolved	4.0UJ	1010J	2.8J	100U	38.3B	1.0U	44000	4.0U	7.0U	4.0U	9.5B	318J	28800	100U	6580	33.9	100U	177000	12.7B	8.0U	22.0U	20.0UJ	40.0UJ	23.1B	25.0	
ISS-7B	Total	4.0UJ	113U	2.0UJ	100U																						

Table H-1 (continued)

1st Quarter, 1991																										
Sampling location ^a	Total/ Dissolved	Element																								
		Ag	Al	As	B	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Ti	V	Zn
ISS-1B	Total	4.5U	124U	2.0UJ	100U	17.5B	0.30U	12500	3.2U	4.7U	2.9U	4.2U	54.8U	8770	100U	13400	33.6	100U	55700	7.7U	3.0UJ	20.4U	2.0UJ	40.0UJ	20.7B	5.1B
ISS-1B	Dissolved	10.0U	200U	10.0U	100U	200U	5.0U	12500	5.0U	50.0U	10.0U	250U	100U	8770	149	13400	33.6	100U	5570	40.0U	3.0U	60.0U	5.0U	100.0U	50.0U	20.0U
ISS-2A	Total	4.5U	9170	2900J	100U	56.5B	0.70	103000	3.2U	4.7U	63.6	325	4800	5720	100U	7540J	119	100U	1240000	20.1B	30.2J	20.4U	20.0UJ	40.0UJ	28.6B	62.4
ISS-2A	Dissolved	4.5U	502	5640J	100U	9.5B	0.40	84500	3.2U	4.7U	22.3	203	1660	5300	100U	6280	193	100U	984000	9.6B	10.5J	20.4U	2.0UJ	4.0UJ	23.1B	33.6
ISS-2B	Total	4.5U	124U	20.0UJ	100U	3.9U	0.30U	60500	3.2U	4.7U	13.4	4.2U	233	49500	100U	44300	112	100U	1910000	7.7U	3.0UJ	20.4U	20.0UJ	40.0UJ	27.9B	5.4B
ISS-2B	Dissolved	4.5U	124U	20.0UJ	100U	3.9U	0.30U	68000	3.2U	4.7U	8.6	4.2U	12900	55100	100U	49200	160	100U	1860000	7.7U	3.0UJ	39.0B	20.0UJ	40.0UJ	22.5B	17.7B
ISS-3A	Total	8.0B	124U	106J	100U	36.1B	0.30U	58100	3.2U	4.7U	2.9U	4.2U	69500	16700	100U	6360	1050	100U	14100	7.7U	3.0UJ	20.4U	2.0UJ	40.0UJ	8.1B	3.5U
ISS-3A	Dissolved	8.3B	2310	252J	100U	139B	0.30U	64100	3.2U	7.0B	2.9U	18.0B	111000	16800	100U	7360	1150	100U	13800	7.7U	7.0J	20.4U	20.0UJ	40.0UJ	3.7U	26.2
ISS-3B	Total	4.5U	124U	2.0UJ	100U	4.2B	0.30U	62900	3.2U	4.7U	2.9U	4.2U	8480	6860	100U	4230B	1350	100U	52800	7.7U	3.0UJ	20.4U	2.0UJ	4.0UJ	20.2B	4.1B
ISS-3B	Dissolved	4.9B	124U	3.6J	100U	4.6B	0.30U	62500	3.2U	6.1B	2.9U	4.2U	43500	7000	100U	4410B	1510	100U	56200	7.7U	3.0UJ	20.4U	2.0UJ	40.0UJ	10.1B	3.5U
ISS-4A ^c	Total																									
ISS-4A	Dissolved																									
ISS-4B	Total	5.0UJ	124U	2.0UJ	155	32.8B	1.0U	71800	4.0U	5.0U	3.0U	5.0U	55.0U	40900	100U	14900	911	100U	105000	8.0U	3.0UJ	21.0U	2.0UJ	4.0UJ	19.6B	4.0UJ
ISS-4B	Dissolved	5.0UJ	124U	2.0UJ	187	91.1B	1.0U	69400	4.0U	5.0U	3.0U	7.7B	10400	35400	100U	13200	1050	100U	91900	8.0U	3.0UJ	22.1B	2.0UJ	4.0UJ	4.0U	58.7J
ISS-5A ^c	Total																									
ISS-5A	Dissolved																									
ISS-5B	Total	5.0UJ	124U	2.4J	444	11.6B	1.0U	88400	4.0U	5.0U	3.0U	5.0U	55.0U	28800	100U	23600	302	100U	13600	8.0U	3.0UJ	21.0U	2.0UJ	4.0UJ	15.6B	4.0UJ
ISS-5B	Dissolved	5.0UJ	124U	4.7J	492	16.6B	1.0U	108000	4.0U	5.0U	3.0U	5.8B	6650	261000	100U	22600	440	100U	125000	8.0U	3.0UJ	22.8B	2.0UJ	4.0UJ	4.0U	16.3J
ISS-6A	Total	5.0UJ	124U	5.8J	1410	30.9B	1.0U	28200	4.0U	5.0U	3.0U	6.1B	729	75000	100U	4210B	320	100U	365000	8.0U	3.0UJ	21.0U	2.0UJ	4.0UJ	16.9B	7.8B
ISS-6A	Dissolved	5.0UJ	155B	6.5J	1740	39.8B	1.0U	28900	4.0U	5.0U	3.0U	10.0B	5150	63000	100U	3820B	425	100U	301000	8.0U	5.3J	21.0U	2.0UJ	4.0UJ	4.0U	19.7J
ISS-6B	Total	5.0UJ	124U	2.0UJ	690	67.3B	1.0U	500000	4.0U	5.0U	3.0U	40.0	55.0U	23800	100U	20500	112	100U	27300	13.0B	3.0UJ	21.0U	11.6J	4.0UJ	38.4B	3100J
ISS-6B	Dissolved	5.0UJ	3380	22.5J	777	127B	1.0U	454000	4.9B	5.0U	10.0	328	21000	21400	100U	18900	273	100U	24800	22.9B	68.0J	21.0U	25.7J	4.0UJ	32.7B	3510J
ISS-7A	Total	5.0UJ	168B	5.3J	544	6.8B	1.0U	18800	4.0U	5.0U	3.0U	5.0U	55.0U	27900	100U	18400	13.3B	100U	825000	8.0U	3.0UJ	21.0U	2.0UJ	4.0UJ	14.6B	8.3J
ISS-7A	Dissolved	5.0UJ	3830	12.5J	690	35.8B	1.0U	57300	4.0U	5.0U	3.3B	10.4B	8830	22000	100U	17400	25.0	100U	648000	9.7B	8.0J	26.3B	2.0UJ	4.0UJ	4.0U	40.0J
ISS-7B	Total	5.0UJ	124U	4.6J	593	4.0U	1.0U	7790	4.0U	5.0U	3.0U	5.0U	55.0U	27400	100U	16400	11.6B	100U	827000	8.0U	3.0UJ	21.0U	2.0UJ	4.0UJ	12.4B	4.1J
ISS-7B	Dissolved	5.0UJ	124U	11.8J	676	4.0U	1.0U	7950	4.0U	5.0U	3.0U	6.8B	4010	24300	100U	14800	65.8	100U	744000	8.0U	3.0UJ	21.0U	2.0UJ	4.0UJ	4.0U	23.9J
8W03B	Total	11.4U	124U	2.0UJ	142	18.9B	0.30U	299000	3.2U	4.7U	2.9U	4.2U	2940	25100	100U	34400	6830	100U	117000	7.7U	3.0UJ	20.4U	2.0UJ	40.0UJ	15.2B	62.1J
8W03B	Dissolved	11.4U	124U	2.0UJ	142	26.2B	1.0B	297000	3.2B	4.7U	2.9U	23.8J	25700	23100	100U	34300	6850	100U	117000	7.7U	3.0UJ	20.4U	2.0UJ	40.0UJ	4.2B	142
8W04B	Total	11.4UJ	124U	2.0U	1120	309	0.70J	78000	3.2U	5.2B	2.9U	29.4	45600	4710B	2000	7800J	10200	100U	74200	15.9B	15.0J	20.4U	2.0UJ	40.0UJ	27.3J	72.9
8W04B	Dissolved	11.4UJ	124U	2.0U	1120	197B	0.30UJ	63800	3.2U	4.7U	2.9U	4.2U	2650	5090	100U	7310J	8600	138	75400	7.7U	3.0UJ	20.4U	2.0UJ	4.0UJ	40.7J	7.7B
8W06B	Total	11.4U	124U	2.0UJ	133	151B	0.30U	130000	3.2U	4.7U	3.2B	4.2U	7820	10900	100U	10900	2280	100U	10400	7.7U	3.0U	20.4U	2.0UJ	40.0UJ	3.7U	11.0J
8W06B	Dissolved	11.4U	124U	2.0UJ	131	235	0.70B	143000	4.5B	4.7U	9.9B	27.9J	21800	13200	100U	12100	2550	100U	115000	7.7U	3.0U	20.4U	2.0UJ	40.0UJ	3.7U	164
8W07B	Total	11.4UJ	200	2.0U	118	46.2B	0.70J	29600	3.2U	4.7U	10.6J	4.9B	370	6490	100U	3200J	519	100U	18200	7.7U	3.0UJ	20.4U	2.2J	4.0UJ	35.5J	10.0B
8W07B	Dissolved	11.4UJ	124U	2.0U	100U	43.1B	0.50J	33000	3.2U	4.7U	4.2J	4.4B	54.8U	8070	100U	3290J	394	100U	19400	7.7U	3.0UJ	20.4U	7.4J	4.0UJ	31.2J	9.9B
8W12A	Total	11.4U	124U	2.0UJ	100U	30.9B	0.30U	743000J	3.2U	7.4B	2.9U	5.6B	3740	2880	100U	12500	1300	100U	29300J	9.1B	3.0UJ	20.4U	2.0UJ	40.0UJ	25.0B	16.5J
8W12A	Dissolved	11.4U	1430J	15.8J	100U	80.5B	0.30U	618000	3.2U	6.2B	2.9U	7.5J	11000	3150B	100U	11200	1110	100U	25200	7.7U	3.0UJ	20.4U	2.0UJ	40.0UJ	31.6B	66.1
8W12B	Total	11.4U	124U	2.0UJ	100U	125B	0.30U	136000	3.2U	4.7U	2.9U	8.1J	427J	3700B	100U	30400	26.5	100U	31600	7.7U	3.0U	20.4U	2.0UJ	40.0UJ	7.3B	23.1
8W12B	Dissolved	11.4U	124U	2.0UJ	100U	104B	0.30U	118000	3.2U	4.7U	2.9U	4.2U	90.4J	3120B	100U	26000	10.2B	100U	27000	7.7U	3.0U	20.4U	2.0UJ	40.0UJ	7.3B	11.0J
8W01S	Total	5.0U	123U	2.0UJ	596	20.4B	1.8B	371000	3.0U	5.0U	3.0U	4.0U	13200	63300	100U	24500	1890J	100U	107000	8.0U	3.0UJ	20.0U	2.0UJ	40.0UJ	13.9B	4.4
8W01S	Dissolved	5.0U	937	2.0UJ	580	61.3B	2.0B	356000	3.0UJ	5.0B	3.0UJ	5.1B	18800	71900	100U	24500	1620J	100U	112000	17.2B	3.0UJ	35.1B	2.0UJ	40.0UJ	15.7B	45.0
8W14S	Total	5.0UJ	7870	10.5J	100U	328	1.0U	94400	4.0U	37.9B	1050	115	25300	5980	100U	28100	998	100U	17200	312	62.4J	21.0U	2.0UJ	4.0UJ	54.2	81.8J
8W14S	Dissolved	5.0UJ	124U	2.0UJ	100U	85.5B	1.0U	103000	4.0U	5.0U	3.0U	5.0U	55.0U	5390	100U	30500	61.0	100U	19800	68.3	3.0UJ	21.0U	2.0UJ	4.0UJ	24.2B	4.0UJ
8W14D	Total	5.0UJ	124U	2.0UJ	100U	33.4B	1.0U	44300	4.0U	5.0U	3.0U	22.8B	79.0B	11200	100U	9920	5.6B	100U	10900	8.0U	3.0UJ	21.0U	2.0UJ	4.0UJ	18.7B	13.9J
8W14D	Dissolved	5.0UJ	492	2.0UJ	100U	38.0B	1.0U	40300	4.0U	5.0U	3.5B	45.9	748	9510	100U	9080	49.8	100U	9390	8.0U	17.6J	22.2B	2.0UJ			

Table H-1 (continued)

Quarter, 1991																													
Sample	Total/ Dissolved	Ag	Al	As	B	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Ti	V	Zn			
S-1B	Total	4.0U	77.0U	2.0U	100U	42.8B	1.0U	31100	4.0U	4.0U	3.0U	7.0U	17500	7420	103	15500	284	100U	48400	7.0U	2.0U	19.0U	1.0U	50.0UJ	8.0U	3.4			
S-1B	Dissolved	4.0U	77.0U	2.0UJ	100U	27.0B	1.0U	19900	4.0U	4.0U	3.0U	7.0U	37.0U	7160	108	14400	79.2	100U	47500	7.0U	2.0U	19.0U	1.0UJ	5.0UJ	8.0U	5.3B			
S-2A	Total	4.0U	2180	20.0R	874	16.7B	1.0U	73200	14.0U	4.0U	26.1	420	1340	4380B	5730	5840	35.6	100U	802000	15.6B	25.8	24.6	1.0UJ	5.0UJ	8.6B	65.8			
S-2A	Dissolved	4.0U	814	6310	850	8.7B	1.0U	68900	7.3	4.0U	19.6	401	499	3700B	5650	5480	22.4	100U	796000	12.4B	18.3	19.0U	1.0U	5.0UJ	8.0U	49.7			
S-2B	Total	4.0U	77.0U	3.5B	4030	5.0U	1.0U	2078	4.0U	4.0U	11.8	7.0U	14200	37800	12800	38000	96.8	100U	1580000	10.1B	2.0UJ	19.0U	1.0U	5.0UJ	8.0U	19.6			
S-2B	Dissolved	4.0U	77.0U	2.0UJ	4350	5.0U	1.0U	22300	4.0U	4.0U	17.8	7.0U	448	41600	13500	38500	59.4	100U	1930000	7.8B	2.0UJ	30.3	10.0UJ	5.0UJ	8.0U	7.9B			
S-3A	Total	14.3	2510	252	100U	182B	1.0U	48600	4.0U	6.0B	3.0U	7.4B	111000	17500	135	5880	1100	100U	139	7.0U	2.0UJ	19.0U	1.0UJ	5.0UJ	8.0U	8.1			
S-3A	Dissolved	9.3B	77.0U	142	100U	40.7B	1.0U	45100	4.0U	4.0U	3.0U	7.0U	79200	16800	127	5080	977	100U	13200	7.0U	2.0UJ	19.0U	1.0UJ	5.0UJ	8.0U	8.1			
S-3B	Total	17.7	147B	10.3J	100U	16.7B	1.0U	222000	4.0U	23.8	3.0U	7.0U	106000	7740	100U	9320	8360	100U	55700	16.9B	2.0UJ	19.0U	1.0UJ	5.0UJ	8.0U	38.6			
S-3B	Dissolved	8.8B	77.0U	7.7J	100U	12.5B	1.0U	215000	4.0U	6.4B	3.0U	7.0U	62500	7540	100U	9060	7970	100U	54100	7.0U	2.0UJ	19.0U	1.0UJ	5.0UJ	8.0U	21.3			
S-4A	Total																												
S-4A	Dissolved																												
S-4B	Total	4.0U	77.0U	2.0UJ	146	356	1.0U	97000	4.0U	4.0U	3.0U	7.0U	29200	35000	100U	16800	2600	100U	89700	7.0U	2.0U	19.0U	1.0UJ	5.0UJ	8.0U	14.3			
S-4B	Dissolved	4.0U	77.0U	2.0UJ	178	132B	1.0U	101000	4.0U	4.0U	3.0U	7.0U	8480	37000	100U	17500	2460	100U	97000	7.0U	2.0U	19.0U	1.0UJ	5.0UJ	8.0U	10.5			
S-5A	Total																												
S-5A	Dissolved																												
S-5B	Total	4.0UJ	77.0U	12.3J	817	84.6B	1.0U	428000J	4.0U	4.0U	3.0U	7.0U	8490J	286000J	294	78200J	3250J	100U	438000J	7.0U	2.0UJ	19.0U	1.3J	50.0R	22.1B	3.6B			
S-5B	Dissolved	4.0UJ	77.0U	10.4	809	83.4B	1.0U	421000J	4.0U	4.0U	3.0U	7.0U	6090J	278000	289	76600J	3170J	100U	425000J	7.0U	2.0UJ	19.0U	1.0J	50.0UJ	21.1B	5.9B			
S-5B	Total	4.0UJ	77.0U	4.8B	484	42.2B	1.0U	317000J	4.0U	4.0U	3.0U	79.1	3850J	15700J	244	14800J	124J	100U	15000J	8.2B	17.1J	19.0U	10.2J	5.0UJ	18.8B	3520			
S-6A	Total	4.0UJ	522	4.8B	484	30.3B	1.0U	328000J	4.0U	4.0U	3.0U	21.8B	37.0U	18700J	251	15200J	93.6J	100U	15400J	7.0U	2.0UJ	19.0U	11.4J	5.0UJ	16.6B	3410			
S-6A	Dissolved	4.0UJ	77.0U	2.0U	486	30.3B	1.0U	91600J	4.0U	12.0B	3.0U	12.0B	34.5	106000J	1340	10800J	2770J	100U	303000J	18.4B	31.9J	19.0U	1.0UJ	5.0UJ	28.3B	68.7			
S-6B	Total	4.0UJ	4360J	10.6J	1310	139B	1.0U	91600J	4.0U	12.0B	3.0U	12.0B	34.5	106000J	1340	8830J	1690J	100U	322000J	7.0U	2.0UJ	19.0U	1.3J	50.0UJ	8.0U	12.2B			
S-6B	Dissolved	4.0UJ	77.0U	6.2J	1420	45.6B	1.0U	874000J	4.0U	4.0U	3.0U	7.0U	480	110000J	1440														
S-7A	Total																												
S-7A	Dissolved																												
S-7B	Total	4.0UJ	77.0U	137J	1490	36.5B	1.0U	162000J	4.0U	4.0U	3.0U	7.0U	19600J	40400J	459	49900J	2390J	100U	960000J	7.0U	2.0UJ	19.0U	2.0J	50.0UJ	24.6B	19.2B			
S-7B	Dissolved	4.0UJ	77.0U	43.0J	1520	19.3B	1.0U	162000J	4.0U	4.0U	3.0U	7.0U	581J	41500J	466	50500J	2280J	100U	108000J	7.0U	2.0UJ	37.4	1.5J	50.0UJ	14.2B	7.8B			
3W03B	Total	4.0U	78.6B	2.0UJ	169	18.1B	1.0U	330000	4.0U	4.0U	3.0U	7.0U	29700	25900	100U	43000	7350	100U	139000	7.0U	2.0UJ	19.0U	1.9B	5.0UJ	18.8B	26.4			
3W03B	Dissolved	4.0U	77.0U	2.0UJ	146	13.1B	1.0U	280000	4.0U	4.0U	3.0U	7.0U	1970	43200	118	31900	6380	100U	115000	7.3B	2.0UJ	20.3B	1.0UJ	5.0UJ	18.0B	31.2			
3W04B	Total	9.5B	77.0U	2.0U	999	234	1.0U	60800	4.0U	4.0U	3.8B	7.0U	11100	3610B	2300	6130	6820	100U	61100	7.0U	4.2J	25.6B	1.0UJ	5.0UJ	8.0U	6.6B			
3W04B	Dissolved	7.9B	77.0U	2.0U	1020	187B	1.0U	59700	4.0U	4.0U	3.0U	7.0U	1030	3490B	2380	6160	6680	100U	63100	7.0U	2.0U	20.6B	1.0UJ	5.0UJ	8.0U	8.7B			
3W06B	Total	7.3B	80.3B	2.0UJ	119	159B	1.0U	154000	4.0U	4.0U	7.5B	7.0U	13800	10700	272	12100	2300	100U	88100	7.0U	2.0U	19.0U	2.9B	5.0UJ	8.0U	10.7B			
3W06B	Dissolved	8.9B	77.0U	2.0UJ	118	148B	1.0U	164000	4.0U	4.0U	3.2B	7.0U	9260	11100	277	12800	2450	100U	94300	7.0U	2.0UJ	19.4B	1.0B	5.0UJ	8.0U	32.5			
3W07B	Total	4.0UJ	1460J	2.0U	100U	56.7B	1.0U	458000J	4.0U	4.0U	3.0U	11.4B	1610J	9970J	100U	3950J	1580J	100U	276000J	9.1B	2.6B	19.0U	1.0UJ	5.0UJ	8.0U	12.9B			
3W07B	Dissolved	4.0UJ	77.0U	2.0U	105	42.6B	1.0U	480000J	4.0U	4.0U	3.0U	7.0U	37.0U	7890	100U	7890	100U	9940	1020	100U	20800	7.0U	3.0J	19.0U	10.0U	5.0UJ	28.0B	62.9	
8W12A	Total	4.0U	1710	13.6	100U	73.3	1.0U	497000	4.0U	4.0U	3.0U	7.0U	11000	1010U	100U	9300	996	100U	20400	7.0U	2.0UJ	19.0U	10.0U	5.0UJ	22.8B	7.1B			
8W12A	Dissolved	4.0U	77.0U	3.8B	100U	21.2B	1.0U	602000	4.0U	4.0U	3.0U	7.0U	3470	1230B	100U	19500	32.6	100U	21000	7.0U	2.0U	19.0U	1.0U	5.0UJ	14.2B	13.6			
8W12B	Total	4.0U	77.0U	2.0U	100U	80.9	1.0U	89100	4.0U	4.0U	3.0U	7.0U	598	1810B	100U	20400	17.9	100U	21800	7.0U	2.0U	19.0U	1.4J	5.0UJ	9.7B	20.3			
8W12B	Dissolved	4.0U	77.0U	2.0U	100U	83.9	1.0U	92800	4.0U	4.0U	3.0U	7.0U	355	2240B	100U	32700	2590	100U	129000	15.8B	2.6J	19.0U	1.0UJ	5.0UJ	9.1B	24.5			
8W01S	Total	14.4	2410	2.0UJ	589	50.6B	2.7B	413000	4.0U	8.4B	3.0U	7.0U	29100	72700J	3550	33800	2690	100U	139000	7.0U	2.0UJ	68.5	1.0UJ	5.0UJ	8.0U	32.6			
8W01S	Dissolved	4.0U	147B	2.0UJ	649	20.7B	2.5B	436000	4.0U	4.0U	3.0U	7.0U	21700	77000J	3830	25800	823	100U	16000	82.2	58.0	21.4B	1.0UJ	50.0UJ	37.1B	66.0U			
8W14S	Total	4.0UJ	4470	10.5	100U	201	1.0U	87800	4.0U	33.8B	417	112	12500	4830B	100U	25800	7.5B	100U	17900	7.0U	2.0U	19.4B	1.0UJ	5.0UJ	12.1B	10.2B			
8W14S	Dissolved	4.0UJ	77.0U	2.0UJ	100U	81.5B	1.0U	97000	4.0U	4.0U	3.0U	7.0U	37.0U	3730B	100U	28200	169	100U	18400	30.0B	19.0	24.2B	1.9B	5.0UJ	14.4B	84.4J			
8W14D	Total	4.0UJ	1370	2.0UJ	100U	72.7B	1.0U	73300	4.0U	4.0U	9.2B	81.6	2070	13100	100U	19500	169	100U	28600	3									

Table H-1 (continued)

Quarter, 1991		Ag	Al	As	B	Ba	Be	Ca	Cd	Co	Cr	Cu	Fe	K	Li	Mg	Mn	Mo	Na	Ni	Pb	Sb	Se	Ti	V	Zn
Sample	Total/																									
Station	Dissolved																									
IS-1B	Total	7.0UJ	116J	2.0UJ	100U	75.3J	1.0J	63400J	4.0UJ	8.0UJ	6.1J	6.0UJ	23900J	8940J	102	16400J	389J	100U	49800J	10.0UJ	2.3J	55.0UJ	2.0UJ	20.0UJ	12.9J	
IS-1B	Dissolved	7.0UJ	96.0UJ	2.0UJ	102	49.2J	1.4J	64500J	4.0UJ	8.0UJ	4.0UJ	6.0UJ	235J	10000J	100U	17200J	224J	100U	50300J	10.0UJ	2.6J	55.0UJ	2.0UJ	2.0UJ	17.5J	38.4UJ
IS-2A	Total																									
IS-2A	Dissolved																									
IS-2B	Total	7.0UJ	96.0UJ	20.0UJ	4280	8.0UJ	1.0J	26300J	4.0UJ	8.0UJ	17.6J	6.0UJ	22600J	43800J	16700	38400J	219J	100U	174000	17.8J	2.0UJ	55.0UJ	20.0UJ	2.0UJ	10.0UJ	208J
IS-2B	Dissolved	7.0UJ	96.0UJ	20.0UJ	4390	8.0UJ	1.0UJ	25800J	4.0UJ	8.0UJ	12.7J	6.0UJ	365J	43600J	17900	39200J	135J	100U	179000	12.5J	2.0UJ	55.0UJ	20.0UJ	2.0UJ	10.0UJ	9.7R
IS-3A	Total	7.0UJ	15600J	168J	100U	335J	1.4J	34900J	4.0UJ	21.8J	37.2J	76.0J	99800J	20300J	119	6670J	945J	100U	15400J	27.2J	48.9J	55.0UJ	2.0UJ	2.0UJ	10.0UJ	183J
IS-3A	Dissolved	14.8J	96.0UJ	266J	100U	46.4J	1.0J	35300J	4.0UJ	8.0UJ	4.0UJ	6.0UJ	73200J	21200J	112	3996J	860J	100U	15300J	10.0UJ	2.0UJ	55.0UJ	2.0UJ	2.0UJ	10.0UJ	38.3J
IS-3B	Total	7.0UJ	187J	5.3J	100U	11.8J	1.0J	206000	4.0UJ	36.2J	6.0J	6.0UJ	74500J	8280J	181	12500J	7320J	100U	62200J	16.7J	2.0UJ	55.0UJ	20.0UJ	2.0UJ	10.0UJ	113J
IS-3B	Dissolved	7.0UJ	96.0UJ	4.4J	138	10.8J	1.0J	249000	4.0UJ	15.6J	4.0J	6.0UJ	28600J	9290J	102	12000J	8900J	100U	73500J	10.0UJ	20.0UJ	55.0UJ	2.0UJ	2.0UJ	16.2J	26.9R
IS-4A	Total																									
IS-4A	Dissolved																									
IS-4B	Total	7.0UJ	96.0UJ	2.0UJ	147	132J	1.4J	6760J	4.0UJ	10.5J	8.6J	7.1J	37600J	26400J	100U	1020J	2280J	100U	92100J	10.0UJ	2.9J	55.0UJ	2.0UJ	2.0UJ	10.0UJ	147J
IS-4B	Dissolved	7.0UJ	96.0UJ	2.0UJ	228	105J	1.0UJ	79000J	4.0UJ	8.0UJ	6.4J	9.0J	2710J	30300J	178	11900J	2140J	100U	108000	10.0UJ	2.0UJ	55.0UJ	2.0UJ	2.0UJ	21.1J	21.9U
IS-5A	Total	7.0UJ	128J	18.5J	606	56.8J	2.2J	349000	4.0UJ	8.0UJ	4.0UJ	6.6J	35700	237000	1850	33400	1490	100U	104000	10.0	2.5J	55.0UJ	20.0UJ	2.0UJ	30.9J	75.1J
IS-5A	Dissolved	7.0UJ	96.0UJ	20.2J	641	45.6J	1.0UJ	399000	4.0UJ	8.0UJ	4.0UJ	6.0UJ	5180J	308000	1870	36200J	1330	100U	121000	10.0UJ	2.0UJ	55.0UJ	20.0UJ	2.0UJ	41.5J	10.1R
IS-5B	Total	7.0UJ	145J	18.2J	541	61.2J	1.6J	391000	4.0UJ	8.0UJ	7.8J	6.0UJ	42900	272000	1800	38300	1580	100U	115000	22.5J	2.0UJ	55.0UJ	20.0UJ	2.0UJ	33.2J	77.7J
IS-5B	Dissolved	7.0UJ	96.0UJ	28.7J	541	40.1J	1.0UJ	319000	4.0UJ	8.0UJ	4.0J	6.0UJ	5060J	263000	1890	29200J	1040	100U	107000	20.8J	2.0UJ	55.0UJ	20.0UJ	42.0J	42.6J	17.3R
IS-6A	Total	7.0UJ	4440J	19.8J	2740	139J	1.4J	212000	4.0UJ	11.3J	21.4J	278J	21400J	98500J	12400	18200J	851J	100U	89100J	10.0UJ	66.1J	55.0UJ	4.5J	2.0UJ	30.8J	1860J
IS-6A	Dissolved	7.0UJ	96.0UJ	2.0UJ	3030	75.3J	1.4J	233000	4.0UJ	8.0UJ	4.0UJ	31.7J	38.0UJ	107000	13400	19200J	800J	100U	97100J	10.0UJ	2.0UJ	55.0UJ	2.0UJ	2.0UJ	24.3J	1030J
IS-6B	Total	7.0UJ	2330J	5.9J	1330	92.1J	1.0J	65000J	4.0UJ	9.0J	7.6J	21.6J	14100J	90800J	14300	8770J	1790J	100U	28100J	10.0UJ	12.5J	55.0UJ	2.0UJ	2.0UJ	21.9J	105J
IS-6B	Dissolved	7.0UJ	96.0UJ	4.4J	1650	54.5J	1.9J	69200J	4.0UJ	8.0UJ	4.0UJ	6.0UJ	1160J	109000	16500	9470J	1660J	100U	341000	10.0UJ	2.0UJ	55.0UJ	2.0UJ	2.0UJ	14.9J	13.2R
IS-7A	Total																									
IS-7A	Dissolved																									
IS-7B	Total	7.0UJ	96.0UJ	155J	826	34.0J	1.0UJ	56400	4.0UJ	16.4J	4.3J	6.0UJ	80700	27400J	2780	26000	1100	100U	735000	10.0UJ	2.9J	55.0UJ	2.0UJ	21.0J	39.7J	98.3J
IS-7B	Dissolved	7.0UJ	96.0UJ	29.2J	894	8.4J	1.0UJ	55300	4.0UJ	8.0UJ	4.0UJ	6.0UJ	202	27900J	2920	25400J	502	100U	778000	10.0UJ	2.0UJ	55.0UJ	20.0UJ	2.0UJ	20.6J	7.8R
IS-7B	Dissolved	7.0UJ	96.0UJ	29.2J	894	8.4J	1.0UJ	55300	4.0UJ	8.0UJ	4.0UJ	6.0UJ	202	27900J	2920	25400J	502	100U	778000	10.0UJ	2.0UJ	55.0UJ	20.0UJ	2.0UJ	20.6J	7.8R
IS-7B	Dissolved	7.0UJ	96.0UJ	29.2J	894	8.4J	1.0UJ	55300	4.0UJ	8.0UJ	4.0UJ	6.0UJ	202	27900J	2920	25400J	502	100U	778000	10.0UJ	2.0UJ	55.0UJ	20.0UJ	2.0UJ	20.6J	7.8R
IS-8B	Total	4.0UJ	84.0UJ	2.0UJ	108	20.4J	1.5J	415000	2.0UJ	3.0UJ	6.1J	7.1J	29500	13200	100U	68800J	8550J	100U	221000	6.0UJ	20.0UJ	18.0UJ	2.1J	2.0UJ	38.1J	35.8U
IS-8B	Dissolved	4.0UJ	84.0UJ	2.0UJ	125	17.6J	1.5J	449000	2.0UJ	3.0UJ	3.0UJ	2.6J	29600	16900J	100U	75500J	9230J	100U	238000	6.0UJ	20.0UJ	18.0UJ	2.0UJ	2.0UJ	53.5J	41.3U
IS-9B	Total																									
IS-9B	Dissolved																									
IS-10B	Total	4.0UJ	84.0UJ	2.0UJ	137	170J	1.0UJ	136000	2.0UJ	3.0UJ	5.6J	2.3J	12100	12800J	839	12200J	2290J	100U	127000	6.0UJ	2.0UJ	18.0UJ	2.0UJ	2.0UJ	27.3J	9.8R
IS-10B	Dissolved	4.0UJ	84.0UJ	2.0UJ	161	179.9J	1.0UJ	137000	2.0UJ	3.0UJ	5.0J	3.6J	10500	13000J	997	12500J	2340J	100U	127000	6.0UJ	2.0UJ	18.0UJ	2.0UJ	2.0UJ	38.6J	19.0R
IS-10B	Dissolved	4.0UJ	84.0UJ	2.0UJ	161	179.9J	1.0UJ	137000	2.0UJ	3.0UJ	5.0J	3.6J	10500	13000J	997	12500J	2340J	100U	127000	6.0UJ	2.0UJ	18.0UJ	2.0UJ	2.0UJ	38.6J	19.0R
IS-10B	Dissolved	4.0UJ	84.0UJ	2.0UJ	161	179.9J	1.0UJ	137000	2.0UJ	3.0UJ	5.0J	3.6J	10500	13000J	997	12500J	2340J	100U	127000	6.0UJ	2.0UJ	18.0UJ	2.0UJ	2.0UJ	38.6J	19.0R
IS-11B	Total	7.0UJ	202J	2.0UJ	100U	67.5J	1.0UJ	85400	4.0UJ	8.0UJ	10.1J	13.6J	488	14100J	100U	6800	3740	100U	50600	10.0UJ	2.2J	55.0UJ	2.0UJ	2.0UJ	20.7J	61.5J
IS-11B	Dissolved	7.0UJ	96.0UJ	2.0UJ	105	49.9J	1.0UJ	79300	4.0UJ	8.0UJ	4.0UJ	12.6J	36.0UJ	14300J	100U	6160J	2670	100U	51500J	17.5J	2.0UJ	55.0UJ	2.0UJ	2.0UJ	20.7J	61.5J
IS-11B	Dissolved	7.0UJ	96.0UJ	2.0UJ	105	49.9J	1.0UJ	79300	4.0UJ	8.0UJ	4.0UJ	12.6J	36.0UJ	14300J	100U	6160J	2670	100U	51500J	17.5J	2.0UJ	55.0UJ	2.0UJ	2.0UJ	20.7J	61.5J
IS-11B	Dissolved	7.0UJ	96.0UJ	2.0UJ	105	49.9J	1.0UJ	79300	4.0UJ	8.0UJ	4.0UJ	12.6J	36.0UJ	14300J	100U	6160J	2670	100U	51500J	17.5J	2.0UJ	55.0UJ	2.0UJ	2.0UJ	20.7J	61.5J
IS-12A	Total	4.0UJ	8980	30.1	100U	279	1.5J	648000	2.2UJ	11.6J	22.2J	27.7	24600	2689J	100U	15200J	2690J	100U	39600J	17.9J	36.6J	18.0UJ	2.0UJ	2.0UJ	80.8J	67.4J
IS-12A	Dissolved	4.0UJ	84.0UJ	2.0UJ	100U	29.3UJ	1.0UJ	668000	2.0UJ	4.1J	3.0UJ	6.3J	1180	1295J	100U	12500	2620J	100U	42700J	8.1J	2.0UJ	41.7J	2.5J	2.0UJ	33.9J	18.4R
IS-12A	Dissolved	4.0UJ	84.0UJ	2.0UJ	100U	29.3UJ	1.0UJ	668000	2.0UJ	4.1J	3.0UJ	6.3J	1180	1295J	100U	12500	2620J	100U	42700J	8.1J	2.0UJ	41.7J	2.5J	2.0UJ	33.9J	18.4R
IS-12A	Dissolved	4.0UJ	84.0UJ	2.0UJ	100U	29.3UJ	1.0UJ	668000	2.0UJ	4.1J	3.0UJ	6.3J	1180	1295J	100U	1										

Table H-2
Summary of Dissolved and Total Rare Earth Concentrations* in Groundwater at MISS

4th Quarter, 1990		CERIUM	DYSPROSIUM	ERBIUM	EUROPIUM	GADOLINIUM	LANTHANUM	LUTETIUM	NEODYMIUM	PRASEODYMIUM	SAMARIUM	TERBIUM	TELLURIUM	THULIUM
Sampling Location ^b		Ce	Dy	Er	Eu	Gd	La	Lu	Nd	Pr	Sm	Tb	Te	Tm
		200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u
MISS-1B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-2A ^c	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-2B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-3A	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-3B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-4A	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-4B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-5A	Total	u	u	u	u	u	356	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-5B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-6A ^c	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-6B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-7B ^c	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W03B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B39W04B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B39W06B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W07B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W12A	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B28W12B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W01S	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W14S	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W14D	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W15S	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved ^d	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W15D	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W17A	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W17B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W18D ^c	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
BACKGROUND	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W02D	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W05B	Total ^e	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u

Table H-2 (continued)

1st Quarter, 1991

Sampling Location ^a	CERIUM	DYSPROSIUM	ERBIUM	EUROPIUM	GADOLINIUM	LANTHANUM	LUTETIUM	NEODYMIUM	PRASEODYMIUM	SAMARIUM	TERBIUM	TELLURIUM	THULIUM
	Ca 200u	Dy 200u	Er 200u	Eu 200u	Gd 200u	La 200u	Lu 200u	Nd 200u	Pr 200u	Sm 200u	Tb 200u	Te 200u	Tm 200u
MISS-1B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-2A	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-2B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-3A	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-3B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-4A ^c	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-4B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-5A ^a	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-5B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-6A	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-6B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
MISS-7B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W03B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W04B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W06B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W07B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W12A	Total	u	u	u	u	255	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	248	u	u	u	u	u	u	u
B28W12B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W01S	Total	u	u	u	u	232	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W14S	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W14D	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W15S	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W15D	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W17A	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W17B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W18D	Total	253	u	u	u	u	231	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
BACKGROUND													
B38W02D	Total	u	u	u	u	u	u	u	u	u	u	u	324
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u
B38W05B	Total	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u

Table H-2 (continued)

3rd Quarter, 1991		CERIUM	DYSPROSIUM	ERBIUM	EUROPIUM	GADOLINIUM	LANTHANUM	LUTETIUM	NEODYMIUM	PRASEODYMIUM	SAMARIUM	TERBIUM	TELLURIUM	THULIUM
Sampling Location ^b		Ce	Dy	Er	Eu	Gd	La	Lu	Nd	Pr	Sm	Tb	Ta	Tm
		200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u	200u
MISS-1B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-2A ^a	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-2B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-3A	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-3B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-4A	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-4B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-5A	Total	u	u	u	u	u	356	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-5B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	209	u	u	u	u	u	u	u	u	302	u	u
MISS-6A ^c	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-6B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
MISS-7B ^c	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	223	u	u	u
B38W03B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B39W04B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B39W06B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W07B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W12A	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B28W12B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W01S	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W14S	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W14D	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W15S	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved ^d	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W15D	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W17A	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W17B	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W18D ^c	Total	857	u	u	u	u	633	u	292	u	u	u	u	u
	Dissolved	798	u	u	u	u	501	u	244	u	205	u	u	u
BACKGROUND														
B38W02D	Total	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u
B38W05B	Total ^d	u	u	u	u	u	u	u	u	u	u	u	u	u
	Dissolved	u	u	u	u	u	u	u	u	u	u	u	u	u

^aConcentrations are reported in units of µg/L. "U" values indicate concentrations that are below the detection limit which is listed immediately below each analyte heading.

^bSampling locations are shown in Figure 4-40.

^cWell was dry.

^dSample lost in processing.

APPENDIX I
Data Quality

DATA QUALITY

Data collected during an RI/FS are generally collected in several defined stages. Initially, collection efforts concentrate on research into the history of the site. The second phase involves the development of an understanding of the site through characterization. If gaps in the understanding of the site are identified, subsequent data collection efforts focus on filling those gaps. Collecting data in stages enables the investigation process to be scoped so that the collection of unnecessary data is minimized.

Data collected during site characterization and RI activities are also used in the baseline risk assessment (BRA) to determine whether contaminants on or migrating from the site represent a significant risk to human health or to the environment. The data are also used in the FS to provide a basis for developing and evaluating remedial action alternatives.

Selection of sampling strategies and the quality or usability of the analytical data will determine how well the site has been characterized. Sampling strategies for the Maywood Site RI are identified and detailed in the Field Sampling Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Maywood Site, Maywood, New Jersey (BNI 1990c) and the Work Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Maywood Site, Maywood, New Jersey (ANL 1990). Data quality objectives (DQOs) for radiological and chemical data are contained in the Quality Assurance Project Plan for the Remedial Investigation/Feasibility Study-Environmental Impact Statement for the Maywood Site, Maywood, New Jersey (BNI 1990d).

The objective of this section is to use tables and explanatory text to summarize the types of quality control samples and data associated with characterization and environmental monitoring. Section I.1 presents the DQOs for characterization and environmental monitoring. Section I.2 is organized by precision, accuracy, representativeness, comparability and completeness

(PARCC), with associated definitions and analytical quality control (QC) results. After QC results are defined and summarized, the data validation/verification process is explained (Section I.3). The final section (Section I.4) deals with an analysis of the results for the samples themselves.

I.1 DATA QUALITY OBJECTIVES

DQO levels for this project were assigned at EPA Levels III and IV (EPA 1987) and have been defined as 80 percent completion (usability) of each of the PARCCs. The determination as to whether the objective has been fulfilled is given in tables in Section I.4. For the purposes of this project, usable data have been defined as data with no qualification that would lead to rejection. Data may be qualified during validation (Section I.3) as being approximated (estimated for concentration) but still usable for BRA purposes, or the data may be rejected outright and therefore not be usable.

I.2 PARCCs

Data quality information is presented and evaluated in terms of PARCC. The evaluation of the PARCC information provides the user with a comprehensive summary of the data as to usability and possible bias for the data submitted. The PARCCs and associated analytical/sampling problems are discussed below.

Precision

Precision is defined as a measurement of the agreement of a set of replicate results among themselves without assumption of any prior information as to the true result. Precision is assessed through the use of a sample and duplicate or a matrix spike (MS) and matrix spike duplicate (MSD). MS and MSD are used more often with organic analytes; inorganic analytes are generally run as a true duplicate and a single matrix spike.

Poor precision may be attributable to poor instrument performance, inconsistent application of methodology, or, most often, nonhomogeneity of the sample matrix, particularly with soils and TCLP leachates. Additionally, it is difficult to generate true duplicates/replicates even with relatively homogenous samples.

Poor instrument performance is usually addressed in EPA methodologies, which give strict guidance on instrument performance. This guidance is typically enforced through the use of surrogate compounds to be added to all samples for organics, and through the preparation of method blank spikes for inorganics. Both surrogates and inorganic method blank spikes (discussed in detail later in this section) are prepared at a specified frequency and have prescribed acceptance criteria.

Inconsistent method application is addressed by analysis of field duplicates and laboratory duplicates to ensure that the procedure, within method acceptance, can be reproduced.

Chemical duplicates. These are used to determine precision, defined as the agreement between a duplicate set of values without assumption of knowledge of the true value. The equation for determining precision as relative percent difference (RPD) is given below:

$$RPD = \frac{|D_1 - D_2|}{D_1 + D_2} \times 200 \quad (\text{Equation 1})$$

where: D_1 = results from sample or matrix spike (MS), and
 D_2 = results from duplicate or matrix spike duplicate
(MSD)

The frequency of duplicates is one duplicate per analytical batch, where a batch is not to exceed 20 samples. MS and MSD are used most often with organic analytes; inorganic analytes are generally run as true duplicates. Precision limits are shown in Table I-1.

Table I-2 gives a summary of the precision associated with the leachate/rinsate characterization data. The 80 percent DQO was met for leachate/rinsate characterization data for all categories of analytes.

Table I-3 presents soil characterization data from the four operable units. The 80 percent DQO for soils was not met for the TCLP/TAL and rare earth metals. (The total analyzed was 493 samples for this category.) The problems encountered with soils are caused by nonhomogeneity of the matrix and cannot be corrected by the laboratory or the field sampling team. When DQOs and sampling plans are formulated, the estimates can easily be wrong. Even when the utmost care and attention to detail are exercised in preparation of sampling and analysis, problems will be encountered due to the variability of the matrix, which cannot be estimated in the original plan. With the interferences encountered, the failure rate for these types of samples would prevent meeting the accuracy goals. This is demonstrated in Table I-3 for metals and rare earths; the extended matrix problems with these analytes were underestimated, resulting in failure to meet the 80 percent goal.

Environmental monitoring precision for water samples is shown in Table I-4. The 80 percent DQO was met for precision for all categories of analytes.

The precision for sediment environmental monitoring samples is presented in Table I-5. The 80 percent DQO was not achieved for TAL metals and wet chemistry parameters. Most outliers were due to either nonhomogeneity of samples or low concentrations of analytes in samples with measurable concentrations.

Radiochemical duplicates. The evaluation of radiochemical precision data involves the determination of a 2-sigma confidence interval. This 2-sigma window is proportional to a confidence level of 95 percent, indicating an error rate of 5 percent or less. Table I-6 tabulates precision data from the subcontractor laboratory for the time period December 1990 to October 1991.

Accuracy

Accuracy is defined as the nearness of a result or the mean of a set of results to the true, known, or reference value. The assessment of accuracy may be determined by analyzing standard reference materials, matrix spikes (MS), laboratory control samples (LCS), and surrogate spikes.

Poor recovery of known concentrations of a particular analyte can be attributable to poor instrument performance, inadequate methodology, method bias, interferences from other analytes or matrices, and nonhomogeneity of the sample matrix. The problems discussed for precision are also applicable to accuracy. The new variable added is "method bias," which has been addressed by EPA in the form of detection limits for both organics and inorganics and surrogate recoveries for organics. To help the reader understand this more thoroughly: in the case of surrogate recoveries for organics, phenol-d5 has a recovery window of 10-94 percent; in other words, the method does not allow 100 percent recovery of this compound. For metals, the approach is based more on instrument detection limits. Lead must be detected at 3 $\mu\text{g/L}$, and antimony must be detected at 60 $\mu\text{g/L}$. All of these limits have been established from information EPA has gathered from laboratories across the U.S. and from method studies they have conducted.

For the determination of accuracy, measured values of a known amount of a particular analyte are compared to the reference or true values, and percent recovery is determined using the equation given below:

$$\% \text{ Recovery} = \frac{\text{measured value}}{\text{reference (known) value}} \times 100 \quad (\text{Equation 2})$$

Matrix spike (MS). An aliquot of an analytical sample fortified with known quantities of specific compounds or elements is termed a matrix spike. After spiking, the matrix spike is

treated as a regular sample and carried through the entire analytical process. The recovery data will help in the determination of matrix interferences (bias) that may be present in environmental samples. The frequency of matrix spikes is one per analytical batch, where a batch is not to exceed 20 samples. Table I-1 gives control limits associated with spike recoveries.

For the determination of analytical accuracy, taking into account the effect of the matrix, the following equation is used:

$$\% \text{ Recovery} = \frac{\text{SSR} - \text{SR}}{\text{SA}} \times 100 \quad (\text{Equation 3})$$

where: SSR = spiked sample result
SR = sample result
SA = spike added

Table I-7 gives the percentage of matrix spikes meeting recovery criteria for leachate/rinsate characterization data. The recovery criteria for aqueous samples were applied to the leachate samples since no limits presently exist for the TCLP method. In general, all criteria were met, except for TCLP/TAL metals and pesticides/PCBs. The majority of outliers were associated with the TCLP leachates and their complex matrices, which sometimes interfere with elemental analysis.

Table I-8 gives the percentage of matrix spikes meeting recovery criteria for soil characterization data. Criteria were not met for the TAL and rare earth metals, semivolatiles, and pesticides/PCBs. The majority of outliers were attributable to either high concentrations of the metal in the sample, nonhomogeneity of the sample, or matrix interferences, particularly in the case of rare earth metals.

Table I-9 summarizes the results of the matrix spike analyses for environmental water monitoring samples. DQOs were met for all categories of analytes.

Table I-10 summarizes the results of the matrix spike analyses for environmental sediment monitoring samples. DQOs were met for all categories of analytes.

Method blank spike [laboratory control sample (LCS)]. Method blank spikes are preparation blanks which have been fortified (spiked) with known quantities of inorganic target analytes. This type of spike is used to determine analytical accuracy and is also used to evaluate the presence or absence of matrix interferences in samples associated with the particular LCS. Equation 2 gives the formula for determining percent recovery for method blank spikes.

Method blank spikes are prepared for each parameter analyzed, with an associated frequency of once per batch, where a batch is not to exceed 20 samples. The purpose of the method blank spike is to ensure that the procedure used for the determination of a particular inorganic parameter is adequate for the determination. Recoveries within required limits can help to preclude the occurrence of false negatives.

Table I-11 summarizes the results for inorganic method blank spikes for both characterization and environmental monitoring data on the basis of matrix. All categories met data quality objectives.

Surrogate standards. These are generally organic compounds that are added to GC and GC/MS standards, blanks, and environmental samples. These standards have properties similar to those of the target analytes for which tests are being conducted. They aid in monitoring preparatory and analytical performance. EPA has established guidance limits for recoveries of these compounds for both water and soil based upon statistical analysis of results from participating laboratories. See Table I-12 for surrogate recovery limits.

Surrogate percent recoveries for leachate/rinsate characterization data are presented in Table I-13. The 80 percent DQO was met for all fractions.

Surrogate percent recoveries for soil characterization data are summarized in Table I-14. The 80 percent DQO was met for all fractions.

Table I-15 presents surrogate recovery data for environmental water monitoring data. The 80 percent DQO was met for all fractions.

Standard reference material (SRM). Standard reference materials contain selected compounds or elements of known concentration from a source external to the laboratory, usually EPA or the National Institute of Standards and Technology, and are used in radiochemistry to verify the accuracy of a particular analytical procedure. The results of SRM recoveries are summarized in Table I-16.

Performance evaluation sample (PE sample). A PE sample containing known analytes at known concentrations is submitted to the laboratory for analysis. This type of sample may be a single-blind (a sample in which the laboratory, although notified that the sample may contain analytes of concern, does not know either the analytes present or their concentrations) or a double-blind (a sample that the laboratory cannot distinguish from a routine environmental sample). Results submitted by the laboratory for these samples are then compared with results from laboratories around the country (or with established upper and lower control limits derived from statistical analysis) to determine whether the laboratory methodology used is capable of routinely meeting accuracy criteria for a particular parameter. Table I-17 gives a summary of performance evaluation results submitted by either BNI or regulatory agencies for the calendar years 1990 and 1991.

Representativeness

Representativeness is the degree to which the data accurately and precisely represent the matrix from which the samples were obtained. Representativeness may be divided into categories of field sampling and laboratory analysis. The term generally refers to the extent to which the data generated define an environmental condition. The assessment of the level of representativeness achieved for a collection activity will be somewhat subjective due to the very nature of the matrix being sampled and tested. The

representativeness of a soil or sediment matrix will be more variable than that of an aqueous matrix because liquids are more easily homogenized.

Representativeness is affected in the field by nonhomogeneity of samples, poor sampling technique, the presence of airborne contaminants, and improper cleaning of sampling equipment. Laboratory representativeness is affected by inadequate procedures or their inconsistent use, sample cross-contamination, and inherent method limitations.

To ensure representativeness of field samples, several controls were used during the course of sampling including compositing of samples, the use of field blanks and rinsates, and trip blanks for volatiles. Compositing increases the homogeneity of the samples and provides better definition of the distribution of chemical and radiological contaminants. Field blanks were collected to determine whether site conditions, sample containers, or preservatives were producing false positives with respect to analytical results. Field rinsates were taken to assess the adequacy of sampling equipment decontamination procedures.

To ensure representativeness in the laboratory, constraints are placed upon analytical methodology. Method blanks are prepared with each parameter analyzed, both organic and inorganic, with an associated frequency of once per batch, where a batch is not to exceed 20 samples. The method or preparation blank is used to determine whether contaminants are present in the laboratory that could have an impact upon the samples associated with that method blank. The presence of laboratory contaminants can cause false positives. The second control on the laboratory is the use of method blank spikes (laboratory control samples) for inorganic analyses, discussed earlier in this section.

False negatives may also be reduced by using sample preservatives and establishing maximum holding times. All liquid samples were preserved at the time of sampling by either refrigeration or the addition of required chemicals, or both. Preservation limits biological and chemical degradation, which would bias sample results. Instructions concerning the use of preservatives are given in the quality assurance project plan.

Method blanks. A method blank consists of a matrix, usually deionized water or sand, to which all reagents are added in the same volumes added to the samples during processing. The method blank is used to check for the presence of laboratory background contamination.

- **Inorganic method blanks.** Inorganic contaminants that were found in several blanks prepared for characterization samples are summarized in Table I-18.

Inorganic analytes that were found in blanks associated with samples analyzed for environmental monitoring are summarized in Table I-19.

- **Organic method blanks.** Common organic contaminants showed up in laboratory blanks for both characterization and environmental monitoring at a frequency of 50 percent but were within method requirements in all cases. EPA recognizes that certain compounds are expected to be present as laboratory contaminants; such compounds include phthalate esters, methylene chloride, and acetone.
- **Radiochemical method blanks.** No radioisotopes were found in method blanks associated with either characterization or environmental monitoring.

Comparability

Comparability is an expression of the confidence with which data are compared to each other. EPA has conducted toxicology research with regard to human health. By using EPA-designated procedures or equivalents, the toxicologist may effectively create and apply BRAs.

Comparability also takes into account the use of equivalent instrumentation. For example, TCLP extracts will be analyzed for arsenic, barium, cadmium, chromium, lead, selenium, and silver by

ICAP rather than by flame or furnace atomic absorption (AA). If flame or furnace AA is used for TCLP, only limited comparisons will be made between the data generated and data generated for TCLP by ICAP.

Completeness

Completeness measures the quantity of usable data resulting from the data collection activities compared with the total possible quantity of data. Completeness is calculated using the following equation:

$$\text{Completeness} = \frac{NA_t}{NP_t} \times 100 \quad (\text{Equation 4})$$

where: NA_t = the number of actual data over a given time, t
 NP_t = the number of data possible over a given time, t

Completeness can be further separated into field sampling completeness and laboratory analytical completeness. Field sampling completeness is defined as the number of samples planned versus the number of samples actually taken. Laboratory analytical completeness is defined as the number of analytes requested versus the number of analytes with usable data after laboratory analysis.

For a BRA to be completed, a certain amount of information must be available to create the models. When the work plan is written, the actual numbers of samples are typically overestimated to take into account problems that may be encountered in sampling, transportation, and analysis. For example, if 100 samples are required for a BRA to be complete and typical loss is 20 percent, then at minimum 120 samples would be collected. Therefore, a completeness goal of 80 percent has taken into account the amount of expected loss and is written into the DQOs for a particular event.

Using the equation above, completeness in sampling goals for characterization was 116 percent, which exceeded the 80 percent objective.

The completeness in sampling goals for environmental monitoring was 92 percent, which exceeded the 80 percent objective.

I.3 DATA VALIDATION/VERIFICATION PROCESS

Data validation

Before any determination can be made as to whether or not DQOs have been met, selected groups of data are subjected to a validation process. The validation process is used for data analyzed under the EPA Statement of Work for Inorganics, Multi-Media, Multi-Concentration (EPA 1988b) and the EPA Statement of Work for Organics, Multi-Media, Multi-Concentration (EPA 1998c) and is performed in accordance with the EPA Functional Guidelines for the Evaluation of Inorganic Analyses (EPA 1988e) and the EPA Functional Guidelines for the Evaluation of Organic Analyses (EPA 1988d).

During the validation process, specific information is assessed with regard to analytical methodology; if necessary, data are flagged (qualified) in accordance with the instructions provided in the functional guidelines. This process involves the review of both raw data and required statement of work forms. Two data validation flags are generally required:

- "R" for rejection
- "J" for estimated

The "R" flag requires no discretion; QC evaluation indicates that the data are not usable (i.e., a problem with sampling or analysis renders the data unusable). The "J" flag could indicate a duplicate outside of requirements or any of numerous other departures from requirements that are borderline. The flagging of data with the "J" symbol does not necessarily mean that data are

faulty or unusable. Rather, it means that the user should exercise discretion when utilizing the affected data for the purposes of risk assessment or remedial investigation since the result may only represent an estimate.

Data validation is performed through the use of validation packages and addresses the following items:

Inorganics

- Holding times
- Initial and continuing calibration verification
- Method blanks/results
- ICP interference check sample
- Matrix spike sample analysis and recovery
- Duplicate sample analysis and precision
- Laboratory control samples
- Furnace atomic absorption QC
- ICP serial dilution results

Organics

- Holding times
- DFTPP and BFB times
- Surrogate spike recoveries
- Matrix spike recovery
- Matrix spike duplicate analysis/precision
- Preparation blank analysis
- Initial and daily calibration
- Internal standard area summary

Data verification

Data analyzed under other regulatory protocols are verified to ensure compliance with the quality assurance project plan and the requirements of other regulatory protocols, where applicable. The verification process includes a technical review of the analytical results presented but, unlike validation, does not include a review

of raw data. Since raw data are not included, data can only be validated to the extent allowed by the information provided.

Data verification addresses the following items:

- Holding times
- Method blank results
- Matrix spike analysis/accuracy
- Duplicate/matrix spike duplicate/precision
- Laboratory control samples (inorganics)
- Surrogate recoveries
- Historical site information

I.4 SAMPLE DATA

As defined in the PARCCs, this section summarizes percentages of usable CLP sample data on an individual analyte basis. Although certain analytes failed to meet the 80 percent goal, sufficient information is present for conclusions to be drawn. Analytes analyzed in accordance with non-CLP protocol were not evaluated for usability and are not included in these tables. Percentages of analytes meeting the 80 percent DQO are tabulated separately for characterization data and environmental monitoring data. Characterization data are given in Table I-20, and environmental monitoring data are presented in Table I-21.

Characterization sample data for volatiles, semivolatiles, and pesticides/PCBs met or exceeded the 80 percent usable DQO. Two metals out of 25 did not meet the 80 percent usable DQO. The majority of rejections for zinc were due to field blank or laboratory method blank contamination.

Zinc is a common field and laboratory contaminant; it is an abundant element and is therefore difficult to eliminate. Copper rejections were generally due to poor matrix spike recoveries, which, in turn, were due primarily to matrix interference.

Table I-1
Spike Recovery and RPD Limits

Compound/Element	Matrix Spike Recovery Limits		RPD Limit	
	Water (percent)	Soil (percent)	Water	Soil
Metals	75-125	75-125	20	20
Wet Chemistry Analytes	75-125	75-125	20	20
1,1-Dichloroethene	61-145	59-172	14	22
Trichloroethene	71-120	62-137	14	24
Chlorobenzene	75-130	60-133	13	21
Toluene	76-125	59-139	13	21
Benzene	76-127	66-142	11	21
1,2,4-Trichlorobenzene	39-98	38-107	28	23
Acenaphthene	46-118	31-137	31	19
2,4-Dinitrotoluene	24-96	28-89	38	47
Pyrene	26-127	35-142	31	36
N-Nitroso-di-n-propylamine	41-116	41-126	38	38
1,4-Dichlorobenzene	36-97	28-104	28	27
Pentachlorophenol	9-103	17-109	50	47
Phenol	12-89	26-90	42	35
2-Chlorophenol	27-123	25-102	40	50
4-Chloro-3-methylphenol	23-97	26-103	42	33
4-Nitrophenol	10-80	11-114	50	50
Lindane	56-123	46-127	15	50
Heptachlor	40-131	35-130	20	31
Aldrin	40-120	34-132	22	43
Dieldrin	52-126	31-134	18	38
Endrin	56-121	42-139	21	45
4,4'-DDT	38-127	23-134	27	50

Table I-2
Leachate/Rinsate Duplicate RPDs

Parameter	Percent Acceptable	Meets Established DQOs
TCLP/TAL Metals	89	Yes
Rare Earth Metals	100	Yes
Wet Chemistry Analytes ^a	100	Yes
Volatiles	100	Yes
Semivolatiles	93	Yes
Pesticides/PCBs	61	No

Table I-3
Soil Duplicate RPDs

Parameter	Percent Acceptable	Meets Established DQOs
TCLP/TAL Metals	61	No
Rare Earth Metals	72	No
Wet Chemistry Analytes ^a	100	Yes
Volatiles	94	Yes
Semivolatiles	93	Yes
Pesticides/PCBs	82	Yes

Table I-4
EM Water Duplicate RPDs (Precision)

Parameter	Percent Acceptable	Meets Established DQOs
TAL Metals	93	Yes
Rare Earth Metals	86	Yes
Wet Chemistry Analytes ^a	100	Yes
Volatiles	100	Yes
Semivolatiles	94	Yes
Pesticides/PCBs	97	Yes

Table I-5
EM Sediment Duplicate RPDs (Precision)

Parameter	Percent Acceptable	Meets Established DQOs
TAL Metals	76	No
Rare Earth Metals	NC ^b	NA ^c
Wet Chemistry Analytes ^a	75	No

^aWet Chemistry Analytes are chloride, nitrate, phosphate-phosphorus, sulfate, TOC, and TOX.

^bNC = not calculated since no samples identified as duplicates had concentrations greater than the established instrument detection limits.

^cNA = Not applicable.

Table I-6
Radiochemical Duplicate RPDs (Precision)

Category	Percent within 2-Sigma	Meets Established DQOs
α -Isotopic	90	Yes
γ -spec	96	Yes
Gross α	100	Yes
Gross β	87	Yes
Isotopic Uranium	94	Yes
Uranium (Fluorescence)	100	Yes

Table I-7
Leachate/Rinsate Matrix Spike Recoveries (Accuracy)

Parameter	Percent Acceptable	Meets Established DQOs
TCLP/TAL Metals	70	No
Rare Earth Metals	84	Yes
Wet Chemistry Analytes ^a	89	Yes
Volatiles	100	Yes
Semivolatiles	95	Yes
Pesticides/PCBs	73	No

Table I-8
Soil Matrix Spike Recoveries (Accuracy)

Parameter	Percent Acceptable	Meets Established DQOs
TAL Metals	62	No
Rare Earth Metals	76	No
Wet Chemistry Analytes ^a	86	Yes
Volatiles	100	Yes
Semivolatiles	79	No
Pesticides/PCBs	78	No

Table I-9
EM Aqueous Matrix Spike Recoveries (Accuracy)

Parameter	Percent Acceptable	Meets Established DQOs
TAL Metals	87	Yes
Rare Earth Metals	89	Yes
Wet Chemistry Analytes ^a	90	Yes
Volatiles	100	Yes
Semivolatiles	80	Yes
Pesticides/PCBs	93	Yes

Table I-10
EM Sediment Matrix Spike Recoveries (Accuracy)

Parameter	Percent Acceptable	Meets Established DQOs
TAL Metals	80	Yes
Rare Earth Metals	82	Yes
Wet Chemistry Analytes ^a	90	Yes

Table I-11
Method Blank Spikes [Laboratory Control Samples, (LCS)]

Parameter	Percent Acceptable	Meets Established DQOs
Characterization Data		
Soil		
TAL Metals	95	Yes
Rare Earth Metals	92	Yes
Wet Chemistry Analytes	99	Yes
Water		
TAL Metals	98	Yes
Rare Metals	97	Yes
Wet Chemistry Analytes	94	Yes
Environmental Monitoring Data		
Soil		
TAL Metals	98	Yes
Rare Earth Metals	100	Yes
Wet Chemistry Analytes	100	Yes
Water		
TAL Metals	100	Yes
Rare Metals	96	Yes
Wet Chemistry Analytes	97	Yes

Table I-12
Surrogate Spike Recovery

Fraction	Compound	Recovery Limits	
		Water (percent)	Soil (percent)
VOA ^a	Toluene-d ₈	88-110	81-117
VOA	4-Bromofluorobenzene	86-115	74-121
VOA	1,2-Dichloroethane-d ₄	76-114	70-121
Acid	Phenol	10-94	24-113
Acid	2-Fluorophenol	21-100	25-121
Acid	2,4,6-Tribromophenol	10-123	19-122
Base Neutral	Nitrobenzene-d ₅	35-114	23-120
Base Neutral	2-Fluorobiphenyl	43-116	30-115
Base Neutral	p-Terphenyl-d ₁₄	33-141	18-137
Pesticide/PCB ^b	Dibutylchloroendate	24-154	20-150

^aVOA = volatile organics analysis

^bPCB = polychlorinated biphenyl

Table I-13**Leachate/Rinsate Surrogate Standard Recovery**

Parameter DQOs	Percent Acceptable	Meets Established
Volatiles		
1,2-Dichloroethane	99	Yes
Bromofluorobenzene	100	Yes
Toluene-d8	99	Yes
Semivolatiles		
2-Fluorobiphenyl	80	Yes
2-Fluorophenol	82	Yes
Tribromophenol	92	Yes
Nitrobenzene-d5	92	Yes
Terphenyl-d14	94	Yes
Phenol-d5	82	Yes
Pesticides/PCBs		
Dibutylchlorendate	96	Yes

Table I-14**Soil Surrogate Standard Recovery**

Parameter DQOs	Percent Acceptable	Meets Established
Volatiles		
1,2-Dichloroethane	92	Yes
Bromofluorobenzene	87	Yes
Toluene-d8	91	Yes
Semivolatiles		
2-Fluorobiphenyl	99	Yes
2-Fluorophenol	99	Yes
Tribromophenol	93	Yes
Nitrobenzene-d5	98	Yes
Terphenyl-d14	97	Yes
Phenol-d5	94	Yes
Pesticides/PCBs		
Dibutylchlorendate	87	Yes

Table I-15
EM Water Surrogate Standard Recovery

Parameter DQOs	Percent Acceptable	Meets Established
Volatiles		
1,2-Dichloroethane	97	Yes
Bromofluorobenzene	97	Yes
Toluene-d8	100	Yes
Semivolatiles		
2-Fluorobiphenyl	98	Yes
2-Fluorophenol	77	Yes
Tribromophenol	82	Yes
Nitrobenzene-d5	97	Yes
Terphenyl-d14	89	Yes
Phenol-d5	86	Yes
Pesticides/PCBs		
Dibutylchlorendate	98	Yes

Table I-16
Standard Reference Material (SRM) Recovery

Category DQOs	Percent Acceptable	Meets Established
α -Isotopic	100	Yes
γ -spec	100	Yes
Gross α	100	Yes
Gross β	100	Yes
Isotopic Uranium	100	Yes
Uranium (Fluorescence)	97	Yes

Table I-17
Performance Evaluation Results

Page 1 of 2

Date	Type	Percent Correct	Parameters Missed
1/90	BNI Blind Volatile	71	Tetrachloroethane, Chloroform
1/90	BNI Blind Base Neutral	100	
1/90	BNI Blind Acid	100	
1/90	BNI Blind Pest/PCB	100	
1/90	EPA WP023 Metals	84	Be, Cd, Hg, Pb, Sb, Ag, Mg, K
1/90	EPA WP023 Wet Chem	98	Nitrate-Nitrogen
1/90	EPA WP023 Pest/PCB	100	
1/90	EPA WP023 Volatile	100	
4/90	BNI Blind Volatile	100	
4/90	BNI Blind Base Neutral	88	Dimethylphthalate
4/90	BNI Blind Acid	100	
4/90	BNI Blind Pest/PCB	80	Endrin
7/90	BNI Blind Volatile	75	Carbon tetrachloride, Dibromochloromethane
7/90	BNI Blind Base Neutral	93	Dibenzofuran
7/90	BNI Blind Acid	100	
7/90	BNI Blind Pest/PCB	86	PCB 1242
7/90	EPA WP024 Metals	90	As, (2)Cd, Mg, Na
7/90	EPA WP024 Wet Chem	93	Alkalinity, Cyanide, Oil and Grease
7/90	EPA WP024 Pest/PCB	100	
7/90	EPA WP024 Volatile	97	Dibromochloromethane
8/90	EPA WS026 Metals	54	(2)Sb, As, Be, (2)Cd, (2)Cr, (2)Ni, (2)Ag, Na
8/90	EPA WS026 Wet Chem	100	
8/90	EPA WS026 Pest/PCB	38	(2)Chlordane, Heptachlor, Heptachlor Epoxide, Dalapon, Hexachlorocyclopentadiene
8/90	EPA WS026 BNA	100	
8/90	EPA WS026 Volatile	93	Chloroform, Dichloromethane
10/90	BNI Blind Volatile	95	Acetone
10/90	BNI Blind Base Neutral	100	

Table I-17 (continued)

Page 2 of 2

Date	Type	Percent Correct	Parameters Missed
10/90	BNI Blind Acid	100	
10/90	BNI Blind Pest/PCB	91	Heptachlor
12/90	EPA WP025 Metals	98	Cadmium
12/90	EPA WP025 Wet Chem	100	
12/90	EPA WP025 Pest/PCB	100	
12/90	EPA WP025 Volatile	100	
1/91	BNI Blind Metals	87	Sb, Ba, Tl, Dy
1/91	BNI Wet Chem	100	
1/91	BNI Pest/PCB	56	DDT, Heptachlor, Heptachlor Epoxide, PCB
1221			
1/91	BNI Volatile	100	
1/91	BNI Base Neutral	100	
1/91	BNI Acid	100	
2/91	EPA WS027 Metals	79	Copper, Sodium, Selenium
2/91	EPA WS027 Wet Chem	69	TSS, pH, Cyanide, corrosivity
2/91	EPA WS027 Pest/PCB	80	Alachlor, Simazine
2/91	EPA WS027 BNA	80	Benzo(b)fluoranthene, Benzo(k)fluoranthene
2/91	EPA WS027 Volatile	100	
4/91	BNI Metals	96	Boron
4/91	BNI Wet Chem	100	
4/91	BNI Pest/PCB	100	
4/91	BNI Volatile	100	
4/91	BNI Base Neutral	100	
4/91	BNI Acid	100	
5/91	BNI Rare Earth Metals	60	Cerium, Lanthanum
7/91	BNI Metals	70	Sb, As, Fe, Mo, Se, Tl, B
7/91	BNI Wet Chem	100	
7/91	BNI Pest/PCB	100	
7/91	BNI Volatile	95	Chloroform

Table I-18
Characterization Method Blanks

Parameter	Matrix	Number of blanks affected
Lead	water	1
Iron	soil	1
Mercury	water	1
Silver	water	1
Tellurium	soil	2
Zinc	water	1
TPH	water	1
TPH	soil	12
Sulfide	soil	3

Table I-19
Environmental Monitoring Method Blanks

Parameter	Matrix	Number of blanks affected
Iron	water	1
Lead	soil	1
Zinc	water	1
Total Kjeldahl Nitrogen	water	2

Table I-20

Characterization Sample Data

Page 1 of 4

Parameter	Percent Acceptable	Meets Established DQOs
Metals		
Aluminum	92	Yes
Antimony	85	Yes
Arsenic	92	Yes
Barium	100	Yes
Beryllium	100	Yes
Cadmium	98	Yes
Calcium	100	Yes
Chromium	83	Yes
Cobalt	98	Yes
Copper	77	No
Iron	97	Yes
Lead	82	Yes
Magnesium	100	Yes
Manganese	98	Yes
Nickel	100	Yes
Potassium	100	Yes
Selenium	95	Yes
Silver	83	Yes
Sodium	100	Yes
Thallium	82	Yes
Vanadium	100	Yes
Zinc	68	No
Wet Chemistry		
Cyanide	96	Yes
Volatiles		
Chloromethane	100	Yes
Bromomethane	100	Yes
Vinyl Chloride	100	Yes
Chloroethane	100	Yes
Methylene Chloride	100	Yes
Acetone	94	Yes
Carbon Disulfide	100	Yes
1,1-Dichloroethene	100	Yes
1,1-Dichloroethane	100	Yes
1,2-Dichloroethene (total)	100	Yes
Chloroform	100	Yes
1,2-Dichloroethane	100	Yes
2-Butanone	81	Yes
1,1,1-Trichloroethane	100	Yes
Carbon Tetrachloride	100	Yes
Bromodichloromethane	100	Yes
1,2-Dichloropropane	100	Yes
cis-1,3-Dichloropropene	100	Yes
Trichloroethene	100	Yes
Dibromochloromethane	100	Yes

Table I-20 (continued)

Parameters	Percent Acceptable	Meets Established DQOs
Wet Chemistry (continued)		
1,1,2-Trichloroethane	100	Yes
Benzene	100	Yes
trans-1,3-Dichloropropene	100	Yes
Bromoform	100	Yes
4-Methyl-2-pentanone	100	Yes
2-Hexanone	100	Yes
Tetrachloroethene	100	Yes
Toluene	98	Yes
1,1,2,2-Tetrachloroethane	100	Yes
Chlorobenzene	100	Yes
Ethyl benzene	100	Yes
Styrene	100	Yes
Xylenes (Total)	100	Yes
Semivolatiles		
Phenol	100	Yes
bis(2-Chloroethyl) ether	100	Yes
2-Chlorophenol	100	Yes
1,3-Dichlorobenzene	100	Yes
1,4-Dichlorobenzene	100	Yes
1,2-Dichlorobenzene	100	Yes
2-Methylphenol	100	Yes
bis(2-Chloroisopropyl) ether	97	Yes
4-Methylphenol	100	Yes
N-Nitroso-di-n-propylamine	100	Yes
Hexachloroethane	100	Yes
Nitrobenzene	100	Yes
Isophorone	100	Yes
2-Nitrophenol	100	Yes
2,4-Dimethylphenol	100	Yes
bis(2-Chloroethoxy) methane	100	Yes
2,4-Dichlorophenol	100	Yes
1,2,4-Trichlorobenzene	100	Yes
Naphthalene	100	Yes
4-Chloroaniline	100	Yes
Hexachlorobutadiene	100	Yes
4-Chloro-3-methylphenol	100	Yes
2-Methylnaphthalene	100	Yes
Hexachlorocyclopentadiene	100	Yes
2,4,6-Trichlorophenol	100	Yes
2,4,5-Trichlorophenol	100	Yes
2-Chloronaphthalene	100	Yes
2-Nitroaniline	100	Yes
Dimethylphthalate	100	Yes
Acenaphthylene	100	Yes
2,6-Dinitrotoluene	100	Yes
3-Nitroaniline	100	Yes
Acenaphthene	100	Yes

Table I-20 (continued)

Parameters	Percent Acceptable	Meets Established DQOs
Semivolatiles (continued)		
2,4-Dinitrophenol	100	Yes
4-Nitrophenol	100	Yes
Dibenzofuran	100	Yes
2,4-Dinitrotoluene	100	Yes
Diethylphthalate	100	Yes
4-Chlorophenyl-phenyl ether	100	Yes
Fluorene	100	Yes
4-Nitroaniline	100	Yes
4,6-Dinitro-2-methylphenol	100	Yes
N-nitrosodiphenylamine	100	Yes
4-Bromophenyl-phenyl ether	100	Yes
Hexachlorobenzene	100	Yes
Pentachlorophenol	100	Yes
Phenanthrene	98	Yes
Anthracene	100	Yes
Di-n-butylphthalate	100	Yes
Fluoranthene	98	Yes
Pyrene	98	Yes
Butylbenzylphthalate	100	Yes
3,3'-Dichlorobenzidine	100	Yes
Benzo(a)anthracene	91	Yes
Chrysene	98	Yes
bis(2-Ethylhexyl)phthalate	98	Yes
Di-n-octylphthalate	100	Yes
Benzo(b)fluoranthene	93	Yes
Benzo(k)fluoranthene	98	Yes
Benzo(a)pyrene	93	Yes
Indeno(1,2,3-cd)pyrene	98	Yes
Dibenz(a,h)anthracene	100	Yes
Benzo(g,h,i)perylene	93	Yes
Pesticides/PCBs		
alpha-BHC	100	Yes
beta-BHC	100	Yes
delta-BHC	100	Yes
gamma-BHC (Lindane)	100	Yes
Heptachlor	100	Yes
Aldrin	100	Yes
Heptachlor epoxide	100	Yes
Endosulfan I	100	Yes
Dieldrin	100	Yes
4,4'-DDE	100	Yes
Endrin	100	Yes
Endosulfan II	100	Yes
4,4'-DDD	100	Yes
Endosulfan sulfate	100	Yes
4,4'-DDT	100	Yes
Methoxychlor	100	Yes
Endrin ketone	100	Yes

Table I-20 (continued)

Page 4 of 4

Parameters	Percent Acceptable	Meets Established DQOs
Pesticides (PCBs)		
alpha-Chlordane	100	Yes
gamma-Chlordane	100	Yes
Toxaphene	100	Yes
Aroclor 1016	100	Yes
Aroclor 1221	100	Yes
Aroclor 1232	100	Yes
Aroclor 1242	100	Yes
Aroclor 1248	100	Yes
Aroclor 1254	100	Yes
Aroclor 1260	100	Yes

Table I-21
Environmental Monitoring Sample Data

Page 1 of 4

Parameter	Percent Acceptable	Meets Established DQOs
Metals		
Aluminum	99	Yes
Antimony	100	Yes
Arsenic	99	Yes
Barium	100	Yes
Beryllium	100	Yes
Boron	100	Yes
Cadmium	100	Yes
Calcium	100	Yes
Chromium	99	Yes
Cobalt	100	Yes
Copper	100	Yes
Iron	100	Yes
Lead	99	Yes
Lithium	100	Yes
Magnesium	100	Yes
Manganese	99	Yes
Molybdenum	100	Yes
Nickel	100	Yes
Potassium	100	Yes
Selenium	100	Yes
Silver	100	Yes
Sodium	100	Yes
Thallium	100	Yes
Vanadium	100	Yes
Zinc	90	Yes
Volatiles		
Chloromethane	100	Yes
Bromomethane	100	Yes
Vinyl chloride	100	Yes
Chloroethane	100	Yes
Methylene chloride	100	Yes
Acetone	100	Yes
Carbon Disulfide	100	Yes
1,1-Dichloroethene	100	Yes
1,1-Dichloroethane	100	Yes
1,2-Dichloroethene (total)	100	Yes
Chloroform	100	Yes
1,2-Dichloroethane	100	Yes
2-Butanone	82	Yes
1,1,1-Trichloroethane	100	Yes
Carbon tetrachloride	100	Yes
Bromodichloromethane	100	Yes
1,2-Dichloropropane	100	Yes
cis-1,3-Dichloropropene	100	Yes
Trichloroethene	100	Yes

Table I-21 (continued)

Parameter	Percent Acceptable	Meets Established DQOs
Volatiles (continued)		
Dibromochloromethane	100	Yes
1,1,2-Trichloroethane	100	Yes
Benzene	100	Yes
trans-1,3-Dichloropropene	100	Yes
Bromoform	100	Yes
4-Methyl-2-pentanone	100	Yes
2-Hexanone	100	Yes
Tetrachloroethene	100	Yes
Toluene	100	Yes
1,1,2,2-tetrachloroethane	100	Yes
Chlorobenzene	100	Yes
Ethyl benzene	100	Yes
Styrene	100	Yes
Xylenes (Total)	100	Yes
Semivolatiles		
Phenol	97	Yes
bis(2-Chloroethyl) ether	100	Yes
2-Chlorophenol	94	Yes
1,3-Dichlorobenzene	100	Yes
1,4-Dichlorobenzene	100	Yes
1,2-Dichlorobenzene	100	Yes
2-Methylphenol	94	Yes
bis(2-Chloroisopropyl) ether	100	Yes
4-Methylphenol	94	Yes
N-Nitroso-di-n-propylamine	100	Yes
Hexachloroethane	100	Yes
Nitrobenzene	100	Yes
Isophorone	100	Yes
2-Nitrophenol	94	Yes
2,4-Dimethylphenol	94	Yes
bis(2-Chloroethoxy) methane	100	Yes
2,4-Dichlorophenol	94	Yes
1,2,4-Trichlorobenzene	100	Yes
Naphthalene	100	Yes
4-Chloroaniline	100	Yes
Hexachlorobutadiene	100	Yes
4-Chloro-3-methylphenol	94	Yes
2-Methylnaphthalene	100	Yes
Hexachlorocyclopentadiene	100	Yes
2,4,6-Trichlorophenol	94	Yes
2,4,5-Trichlorophenol	94	Yes
2-Chloronaphthalene	100	Yes
2-Nitroaniline	100	Yes
Dimethylphthalate	100	Yes
Acenaphthylene	100	Yes
2,6-Dinitrotoluene	100	Yes

Table I-21 (continued)

Parameter	Percent Acceptable	Meets Established DQOs
Semivolatiles (continued)		
3-Nitroaniline	100	Yes
Acenaphthene	100	Yes
2,4-Dinitrophenol	94	Yes
4-Nitrophenol	94	Yes
Dibenzofuran	100	Yes
2,4-Dinitrotoluene	100	Yes
Diethylphthalate	100	Yes
4-Chlorophenyl-phenyl ether	100	Yes
Fluorene	100	Yes
4-Nitroaniline	100	Yes
4,6-Dinitro-2-methylphenol	94	Yes
N-nitrosodiphenylamine	100	Yes
4-Bromophenyl-phenyl ether	100	Yes
Hexachlorobenzene	100	Yes
Pentachlorophenol	94	Yes
Phenanthrene	97	Yes
Anthracene	100	Yes
Di-n-butylphthalate	100	Yes
Fluoranthene	98	Yes
Pyrene	100	Yes
Butylbenzylphthalate	100	Yes
3,3'-Dichlorobenzidine	100	Yes
benzo(a)anthracene	100	Yes
Chrysene	100	Yes
bis(2-Ethylhexyl)phthalate	100	Yes
Di-n-octylphthalate	100	Yes
Benzo(b)fluoranthene	100	Yes
Benzo(k)fluoranthene	100	Yes
Benzo(a)pyrene	100	Yes
Indeno(1,2,3-cd)pyrene	100	Yes
Dibenz(a,h)anthracene	100	Yes
Benzo(g,h,i)perylene	100	Yes
Pesticides/PCBs		
alpha-BHC	100	Yes
beta-BHC	100	Yes
delta-BHC	100	Yes
gamma-BHC (Lindane)	100	Yes
Heptachlor	100	Yes
Aldrin	100	Yes
Heptachlor epoxide	100	Yes
Endosulfan I	100	Yes
Dieldrin	100	Yes
4,4'-DDE	100	Yes
Endrin	100	Yes
Endosulfan II	100	Yes
4,4'-DDD	100	Yes
Endosulfan sulfate	100	Yes
4,4'-DDT	100	Yes

Table I-21 (continued)

Page 4 of 4

Parameter	Percent Acceptable	Meets Established DQOs
Pesticides/PCBs (continued)		
Methoxychlor	100	Yes
Endrin ketone	100	Yes
alpha-Chlordane	100	Yes
gamma-Chlordane	100	Yes
Toxaphene	100	Yes
Aroclor 1016	100	Yes
Aroclor 1221	100	Yes
Aroclor 1232	100	Yes
Aroclor 1242	100	Yes
Aroclor 1248	100	Yes
Aroclor 1254	100	Yes
Aroclor 1260	100	Yes

APPENDIX J

Hydrogeologic Logs

APPENDIX J

Hydrogeologic Logs



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.					
MISS on Site				FUSRAP		14501	1 OF 2	B38G19					
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING					
9-18-89			N 9524.0; E 9585.0			Vertical		-----					
BEGUN	COMPLETED	DRILLER		DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH					
9-18-89	9-20-89	Hydro Group, Inc.		Acker Soil Sentry	8"	18.0	9.8	27.8					
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK					
18.1/65*		1	11	NA	53.0	7.0/46.0 / NA		18.0/35.0					
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:								
140 lbs/30 in		none			J. Loren Matthews								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS	CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.F.	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.8	1-7	8-10				53.0				0.0 - 0.8 ft: Sandy SILT, (ML); Dusky brown (5YR2/2), damp, loose, mostly fine-grained sand, trace fine rock fragments and clay.	Borehole advanced using 8" hollow stem augers with center plug.
SS	2.0	1.3	6-3	3-4				52.2				0.8 - 2.6 ft: Silty SAND, (SM); Moderate brown (5YR3/4) to Black (N1), damp, medium dense, cinder and coal fragments, mostly well graded, fine to coarse-grained sand with silt; little fine to coarse size rock fragments; Dark reddish brown sandstone fragments in split spoon tip.	Borehole monitored by TMA/Eberline during drilling for organic vapors and explosive gases; samples scanned for radioactive contamination - no elevated levels detected.
SS	2.0	1.5	4-4	6-12				50.4				2.6 - 3.9 ft: Silty CLAY, (ML); Dark gray (N3) to Black (N1), damp, medium stiff, little fine-grained sand, plant fibers and wood fragments, organic odor.	
SS	2.0	1.0	9-17	17-16				49.1				3.9 - 4.7 ft: SAND, (SP); Dark gray (N3), damp, medium dense, mostly fine-grained sand with little medium-grained sand and trace to little silt.	
SS	2.0	1.6	15-14	16-11				48.3				4.7 - 5.5 ft: Sandy CLAY, (CL); Olive gray (5Y4/1), damp to moist, medium stiff, fine-grained sand.	
SS	2.0	1.0						47.5				5.5 - 13.4 ft: SAND, (SP); Grayish black (N2) to black (N1), moist to wet, medium dense to dense, mostly fine to medium-grained with trace to little coarse-grained sand, trace silt.	
ST	2.0	2.0	100					10				at 7.7 ft: 3" layer of well graded, fine to coarse-grained sand.	Performed falling-head permeability test inside 4" PVC at 10'; mean permeability = 1.6E-06 cm/s.
SS	2.0	1.4	8-16	21-34				39.6				at 9.4 ft: Silt and Sand, Brownish gray (5YR4/1), mostly fine-grained with trace medium to coarse-grained sand; pocket of black fine-grained sand with little silt; wet, medium dense, very rapid dilatancy, organic odor.	
SS	1.8	0.9	20-16	15				38.9				10.0 - 12.0 ft: Sand, Dark gray (N3), moist to wet, dense, mostly fine-grained with trace coarse-grained sand, trace fine gravel; grades sharply into well graded, fine to coarse-grained sand and medium gravel at 12.0'.	
SS	2.0	1.2	9-23	29-42				15				13.4 - 14.1 ft: Silty SAND, (SM); Grayish red (10R4/2), moist to wet, dense, mostly fine to medium-grained with trace coarse-grained sand, some fine to coarse-size rock fragments, 45-degree angle at contact, black, moist, dense.	Hole gamma-logged by TMA/Eberline to a depth of 15'.
NX	4.8	2.0	42%					35.0				14.1 - 18.0 ft: Sandy SILT, (ML-SM); Grayish red (10R4/2) to Very dusky red (10R2/2) with curved black bands of fine-grained sandy silt, moist, very dense, little fine to coarse-size gravel, trace clay, organic odor.	Auger refusal at 18'.
NX	5.0	3.4	68%					20				18.0 - 27.8 ft: SANDSTONE; Grayish red (10R4/2) to Dark reddish brown (10R3/4), medium to coarse-grained sandstone, with trace fine quartz gravel, medium hard to hard, moderately weathered to fresh, some mica flakes; moderately fractured, fractures range from horizontal to 45 degrees, black staining on fracture surfaces to 25.1'; rounded surfaces may indicate gravel/cobbles with some soil matrix in top 6".	
												at 24.0 ft: contains small blebs of soft siltstone, some greenish in color, evidence of few high angle joints.	Drill water return diminished to zero during second core run.

SS = SPLIT SPOON; NX = CORE BARREL;
HX = HAND AUGER; ST = SHELBY TUBE

SITE

MISS on Site

Last Update: 04-30-92

HOLE NO. B38G19



GEOLOGIC DRILL LOG										PROJECT	JOB NO.	SHEET NO.	HOLE NO.	
										FUSRAP	14501	2 OF 2	B38G19	
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. TESTS P.S.I.	TIME IN MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: 2MYMD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
								25.2					Attempt packer test in rock, unable to reach bottom of hole due to heaving sands. Borehole backfilled with bentonite cement on 9/20/89.	
												TOTAL DEPTH = 27.8 FT.		
SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE										SITE	MISS on Site		Last Update: 04-30-92	HOLE NO. B38G19

* Core recovery refers to total soil and rock sample.

Coordinates and ground elevation estimated from site plan.

Description and classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
				FUSRAP		14501	1 OF 2	B38G20			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
MISS on Site			N 9524.0; E 9650.0			Vertical		-----			
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
9-14-89	9-18-89	Hydro Group, Inc.	Acker Soil Sentry		8"	15.0	10.0	25.0			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
14.6/58%		1	10	NA	53.0	6.0/47.0 6.0		15.0/38.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			J. Loran Matthews						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.					
SS	2.0	1.8	1-3 6-7				53.0		0.0 - 11.0 ft: FILL.	Borehole advanced using 8" hollow stem augers with center plug.	
SS	2.0	0.8	1-8 12-16						0.0 - 0.5 ft: Moderate yellowish brown (10YR5/4) to Dark yellowish brown (10YR4/2); dry, loose, trace fine to medium-grained sand; fibrous material, animal hide residue.	Borehole monitored by TMA/Eberline during drilling for organic vapors and explosive gases; samples scanned for radioactive contamination - no elevated levels detected.	
SS	2.0	1.4	1-7 12-14						0.5 - 2.0 ft: Black (N1) to Grayish brown (5YR3/2), damp, loose, crushed cinders, mostly silt with fine to coarse-grained sand, trace fine to medium rock fragments.		
SS	1.3	1.1	4-9 50/4"						2.0 - 7.5 ft: Grayish red (10R4/2), damp, medium dense, mostly medium to coarse-grained with trace fine-grained sand, trace fine gravel.	Attempt falling-head permeability test, unable to establish seal around bottom of augers, obstructed by boulder(?) at 7.3'.	
SS	2.0	1.8	8-7 4-3						at 7.5 ft: 4" layer of Silty Clay (CL): Olive gray (5Y4/1) to Olive black (5Y2/1), inclusions of medium to coarse-size rock fragments, little fine to medium-grained sand, trace coal and red brick fragments, moist, medium stiff.	Attempt permeability test at 10' abandoned due to heaving sand.	
SS	2.0	1.1	7-7 10-11				42.0		8.0 - 10.4 ft: medium to coarse-grained Sand, Grayish red (10R4/2), grading into Moderate brown (5YR4/4) at 9.0', wet, medium stiff consistency.		
SS	2.0	1.3	3-6 12-32						at 10.4 ft: fine to medium-grained SAND, Moderate brown (5YR3/4) to Grayish brown (5YR3/2), trace silt, wet, medium dense.		
SS	1.0	0.6	21 50						11.0 - 15.0 ft: Silty SAND and SAND (SM); top 5" is Grayish brown (5YR3/2), silty, fine to medium-grained sand, trace fine to medium size gravel, wet, medium dense.	Split spoon and auger refusal at 15'.	
NX	5.0	2.8	56%				38.0		at 11.4 ft: 1" layer of fine-grained Sandy SILT (ML-SM), Dark gray (N3) to Black (N1), trace fine gravel and clay, wet, medium dense.	Gamma-logged by TMA/Eberline to a depth of 15'.	
									at 12.0 ft: grades into Sandy SILT (ML-SM), Dark reddish brown (10R3/4), fine to medium-grained, little fine to coarse size rock fragments, trace coarse-grained sand and clay, moist, very dense.	Pulled augers from hole, insert 4" drill casing to 12'.	
NX	5.0	1.9	38%						at 14.0 ft: Dark reddish brown (10R3/4), medium to coarse size rock fragments, some fine-grained sandy silt, trace medium to coarse-grained sand and clay, moist, very dense.	Lost water return during coring at -22'.	
									15.0 - 25.0 ft: SANDSTONE, Blackish red (5R2/2), fine to medium-grained sandstone, mostly red quartz with flecks of clear mica, hard, slightly weathered, moderately fractured, bedding is horizontal to -20 degrees.		
									at 16.6 ft: horizontal to 10 degree fractures with black staining on 10 degree joints.		
SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE				SITE		MISS on Site		Last Update: 04-30-92	HOLE NO. B38G20		



GEOLOGIC DRILL LOG										PROJECT	JOB NO.	SHEET NO.	HOLE NO.
										FUSRAP	14501	2 OF 2	B38G20
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOKS % CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: 2MYMD) DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					PRESS. P.S.I.	TIME IN MIN.							
											TOTAL DEPTH = 25.0 FT.	Clean out casing and perform falling-head test at 12' - rod drop from -23 - 23.5', no water loss; Mean permeability = $2.2E-03$ cm/sec. Borehole backfilled with bentonite cement on 9/21/89.	
SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE										SITE	MISS on Site	Last Update: 04-30-92	HOLE NO. B38G20

* Core recovery refers to total soil and rock sample.
Description and classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				FUSRAP		14501	1 OF 2	B38G21			
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING			
N 9524.0; E 9700.0			Vertical		-----						
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH				
9-13-89	9-13-89	Hydro Group, Inc.	Acker Soil Sentry	8"	25.0	4.6	29.6				
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK			
19.9/67*		1	14	NA	53.0	7.5/45.5 7.5		25.0/28.0			
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:						
140 lbs/30 in		none			J. Loran Matthews						
SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.H.	PRESS. P.S.F.I.	TIME MIN.					
SS	2.0	1.7	2-6 6-9				53.0			0.0 - 7.5 ft: FILL; Top 4" is Moderate brown (5YR3/4), damp, loose, mostly silty, fine to medium-grained sand with trace fine to medium gravel. at 0.4 ft: Black (N1) crushed cinders in a mostly fine to medium-grained sandy silt matrix, trace fine to medium rock fragments, damp, moderately dense. 2.0 - 3.8 ft: Cinders as above, top 12" is Moderate brown (5YR4/4) to Grayish brown (5YR3/2), mostly silty, fine to coarse-grained sand, little fine to coarse size rock fragments (shale?), damp, medium dense; 1" layer of fine-grained Sand, Pale brown (5YR5/2) at 2.1'. at 3.8 ft: fine to medium-grained Sandy Silt, Dark reddish brown (10R3/4), little fine to coarse size rock fragments, trace coarse-grained sand, damp, medium dense. 4.0 - 6.0 ft: fine to medium-grained Sandy Silt, Dark reddish brown (10R3/4), with little to some fine to coarse size rock fragments, trace clay and coarse-grained sand, moist to wet, loose. at 6.0 - 6.3 ft: Dark reddish brown (10R3/4) to Dusky brown (5YR2/2), Clayey Silt with trace fine-grained sand and fine to medium size rock fragments, damp to moist, soft; grades into Medium dark gray (N4) to Olive gray (5Y4/1) clayey, fine to medium-grained Sand, trace coarse-grained sand, moist, medium dense. 7.5 - 13.4 ft: SAND Medium dark gray (N4) to Olive gray (5Y4/1), moist, medium dense, fine to medium-grained sand with clay, trace coarse-grained sand. at 8 ft: changing to Dark gray (N3) to Black (N1), wet, medium dense. by 10 ft: grades to mostly medium-grained with trace coarse-grained sand. 12.0 - 12.8 ft: Dark gray (N3) to Black (N1), fine to medium-grained sand with trace of coarse-grained sand, wet, medium dense. 13.4 - 25.0 ft: Gravelly SAND, mostly Dark gray (N3), wet, very dense, mostly fine and medium-grained sand with few coarse-grained and fine to medium gravel. at 13.8 ft: inclusions of fine and medium size gravel, some organics. at 18.4 ft: Sand, gray to moderate brown, wet, medium density. 18.5 - 18.6 ft: Silty Clay, greenish gray, with fine-grained sand layer, decrease moisture content to damp, very stiff. at 19.3 ft: alternating layers of Grayish black (N2) and Dark reddish brown (10R3/4) fine-grained Sandy Silt (ML-SM), few fine to coarse size rock fragments with trace clay, moist, very dense. at 22 ft: increase percent of coarse size rock fragments in fine-grained silty sand matrix, occasional grayish black mottling. by 24.0 ft: mostly Dark reddish brown (10R3/4), fine-grained sandy silt, decrease to little fine to coarse size fragments, trace to little clay. at 24.9 ft: 2" layer of grayish black fine-grained Sand.	Borehole advanced using 8" O.D. hollow stem augers without center plug. Borehole monitored by TMA/Eberline during drilling for organic vapors and explosive gases; samples scanned for radioactive contamination - no elevated levels detected. Encountered heaving sands inside HSA between 10 - 12'. Remaining samples obtained using retaining basket in sampler. Gamma-logged by TMA/Eberline to a depth of 22'.
SS	2.0	2.0	12-5 9-7								
SS	2.0	0.4	7-3 3-4					5			
SS	2.0	0.8	2-4 7-18				45.5				
SS	2.0	2.0	4-6 15-18								
SS	2.0	1.8	6-10 12-18					10			
SS	1.8	0.9	3-10 18 50/4"				39.6				
SS	2.0	0.8	9-23 15-11					15			
SS	2.0	0.9	27-37 43-27								
SS	2.0	1.0	6-13 28-50								
SS	2.0	1.2	17-22 23-33					20			
SS	2.0	0.9	13-30 42-43								
SS	1.0	0.9	6-35 50/0"				28.0				
SS = SPLIT SPOON; NX = CORE BARREL; SITE HX = HAND AUGER; ST = SHELBY TUBE											
MISS on Site						Last Update: 04-30-92		HOLE NO. B38G21			



GEOLOGIC DRILL LOG										PROJECT	JOB NO.	SHEET NO.	HOLE NO.	
										FUSRAP	14501	2 OF 2	B38G21	
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOWS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. P.S.F.	WATER TESTS	TIME MIN.	ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: 2MYWD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
NX	4.6	4.6	100%						23.4				25.0 - 29.6 ft: SANDSTONE, alternating laminations of Dark reddish brown (10R3/4) and Grayish red (10R4/2), fresh, medium hard to hard, fine to medium-grained, some mica flakes; slightly to moderately fractured, mostly horizontal fractures, parallel with bedding; bedding is horizontal to 10 degrees; Black stains and clay filling on some fracture surfaces; near vertical concave joint from 25.8 - 27.3'.	Split spoon and auger refusal at 25'. Core barrel blocks off 4.6' into first core run. Borehole backfilled with bentonite cement on 9/21/89.
												TOTAL DEPTH = 29.6 FT.		

* Core recovery refers to total soil and rock sample.

Description and classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NX = CORE BARREL;
HX = HAND AUGER; ST = SHELBY TUBE

SITE

MISS on Site

Last Update: 04-30-92

HOLE NO. B38G21



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				N 9525.0; E 9749.0		14501	1 OF 1	B38G22			
BEGUN		COMPLETED		DRILLER		DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH
9-12-89		9-12-89		Hydro Group, Inc.		Acker Soil Sentry		8"	15.3	5.4	20.7
CORE RECOVERY (FT./%)			CORE BOXES	SAMPLES	SEL. TOP CASING	GROUND EL.		DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK	
13.8/67*			1	10	NA	54.0		9.0/45.0 9.0		15.3/38.7	
SAMPLE HAMMER WEIGHT/FALL			CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in			none			J. Loran Matthews					
SAMP AND DIAM.	SAMP. ADV. LEN CORE	SAMPLE REC. CORE REC.	SAMPLE RECOVERY %	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
				LOSS IN G.P.M.	PRESS. P.S.I.						
SS	2.0	1.4	5-20 20-12			54.0			0.0 - 5.9 ft: FILL, top 3" Moderate brown (5YR4/4) becoming Black (N1), slightly damp, loose, medium dense to dense, mostly fine and medium-grained silty sand, few fine to medium size gravels.	Borehole advanced using 8" O.D. hollow stem augers with no center plug. Borehole monitored by TMA/Eberline during drilling for organic vapors and explosive gases; samples scanned for radioactive contamination - no elevated levels detected. Split spoon and auger refusal at 15.3'. Gamma-logged by TMA/Eberline to a depth of 14.0'. Borehole backfilled with bentonite cement on 9/21/89. * Core recovery refers to total soil and rock sample. Description and classification by visual examination of sample. Colors from "Rock-Color Chart" (GSA, 1948).	
SS	2.0	1.3	13-5 2-2					0.2 - 2.0 ft: crushed cinders in fine and medium-grained sand, little coarse-grained sand and fine to coarse size rock fragments; trace Pale yellowish orange (10YR8/6) fragments (fire bricks?); 2.5" red brick fragment at bottom of spoon.			
SS	2.0	0.2	1-1 2-8					at 2 ft: mostly Grayish brown (5YR3/2) to Black (N1), crushed cinders and brick fragments in mostly a fine to medium-grained silty sand matrix, damp, loose.			
SS	2.0	2.0	9-12 12-13			48.1		at 3.8 ft: Grayish brown (5YR3/2), Clayey Silt with trace fine-grained sand and trace to little fine to medium size gravel, soft, moist, some cinders.			
SS	2.0	1.4	6-10 15-23					5.9 - 11.8 ft: SAND, (SM-SP); Moderate brown (5YR4/4), moist to wet, medium dense, well graded, mostly medium to coarse-grained with trace fine-grained sand, trace to little silt, trace fine gravel.			
SS	2.0	2.0	17-18 37-48					at 7.2 ft: increase of intervals with higher percentages of medium and coarse-grained sand, trace fine gravel.			
SS	2.0	1.1	55-47 29-45			42.2		8.0 - 10.0 ft: mostly Moderate yellowish brown (10YR5/4), fine-grained sand with trace silt, wet, medium dense.			
SS	1.3	1.3	23-28 50/4"					10.0 - 12.0 ft: well sorted, fine to coarse-grained sand with trace to little fine to coarse gravel; some large, flat sandstone fragments.			
NX	2.0	1.0	50%			38.7	15	at 11.5 ft: 1" layer of Black (N1) fine to medium-grained sand.			
NX	3.4	2.1	82%					at 11.8 ft: grades into fine-grained silty sand, trace fine to medium size gravel; little to some fine to coarse size rock fragments, trace clay, damp, very dense.			
								11.8 - 15.3 ft: Sandy SILT (ML-SM); Dark reddish brown (10YR3/4), damp, very dense, mostly fine-grained with trace medium to coarse-grained sand with some medium to coarse size rock fragments.			
								at 14 ft: increase fine to medium size rock fragments.			
						33.3	20	15.3 - 20.7 ft: SANDSTONE and SILTSTONE; Dark reddish brown (10R3/4) to greyish red (10R4/2); fine to medium-grained Sandstone between 15.8 - 17.5', and 20.5 - 20.7', medium hard to hard, moderate to highly weathered; Siltstone is medium soft to medium hard, moderate to highly weathered; some mica flakes, some weakly cemented zones; most fractures are nearly horizontal, vertical fractures are probably mechanically induced, evidence of vertical jointing in upper sandstone, Black (N1) stain on fracture surfaces.			
TOTAL DEPTH = 20.7 FT.											

SS = SPLIT SPOON; NX = CORE BARREL; SITE
 NX = HAND AUGER; ST = SHELBY TUBE

MISS on Site

Last Update: 04-30-92

HOLE NO. B38G22



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.				
MISS on Site				FUSRAP		14501	1 OF 1	B38G23				
SITE		COORDINATES				ANGLE FROM HORIZ		BEARING				
9-21-89		9-22-89		Hydro Group, Inc.		Acker Soil Sentry		8"				
14.0/69*		1		10		NA		54.0				
140 lbs/30 in		none		C. A. Clark								
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME IN MIN.						
SS	2.0	1.6	3-1 4-8				54.0			0.0 - 4.3 ft: FILL.	Borehole advanced using 8" hollow stem augers to a depth of 12.3'.	
SS	2.0	1.2	5-6 4-3				49.7	5		0.0 - 0.6 ft: Sandy Loam, mostly Moderate brown (5YR4/4), slightly moist to moist, slight cohesion, fine to coarse-grained angular sand, abundant tree roots and grass. 0.6 - 1.0 ft: Greyish blue (5PB5/2) moderately decomposed cowhides. 1.0 - 4.3 ft: Silty Sand, fine to medium-grained with fine to medium gravel; abundant slag, cinders, and concrete fragments.	Borehole monitored by TMA/Eberline during drilling for organic vapors and explosive gases; samples scanned for radioactive contamination.	
SS	2.0	1.9	1-1 2/12"				47.8			4.3 - 6.2 ft: Silty SAND, (SM); Moderate brown (5YR4/4), slightly moist to moist, soft, moderate cohesion, loose; -20-30% silt with well sorted, medium-grained sand, sand content and particle size decrease with depth.		
ST	2.0	0.0	na				44.7	10		6.2 - 9.3 ft: Sandy SILT, (SM-ML); Greyish red (10R4/2) and Moderate yellowish brown (10YR5/4), wet, moderate cohesion, medium stiff to stiff; thin interbeds of silt and sand of variable layer thickness, sandy layers are moist to wet and noncohesive.		
SS	1.9	1.6	7-17 40 60/0.4'				42.6			9.3 - 11.4 ft: SAND and SILT, (SM-ML); Moderate brown (5YR4/4), wet, slight cohesion, stiff; moderate adhesion due to high moisture content; -55% sand, mostly medium and coarse-grained with some to trace fine-grained silica sand.	Sampled and gamma-logged by TMA/Eberline to a depth of 12.0'.	
SS	0.3	0.3	60/0.3'				41.7			11.4 - 12.3 ft: SAND and GRAVEL, (SM-GP); Moderate brown (5YR4/4) changing to Olive black (5Y2/1) at 11.9', wet, noncohesive, trace fines adhere to particles; well sorted, fine and medium-grained subangular sand; grades into medium and coarse-grained sand, slightly more rounding; some gravel up to 0.5".	Drill hole advanced using NX surface set bit to a depth of 20.3'; drilling fluid is hydrant water.	
NX	4.0	1.8	45%					15		12.3 - 20.3 ft: SANDSTONE; Grayish red (5R4/2), moderately hard, very highly fractured and moderately weathered, mature, well sorted, fine-grained silica sand, moderately cemented, mud and silica cement, very slight reaction to HCl, soft matrix; jointing is 80% normal to core axis, 20% inclined to 30 degrees, most are open, planar to slightly undulating, slightly weathered and faded; joint spacing increases with depth, becoming slightly fractured.	Borehole backfilled with bentonite cement on 9-22-89.	
NX	1.0	0.9	90%				33.7	20		TOTAL DEPTH = 20.3 FT.	* Core recovery refers to total soil and rock sample.	
NX	3.0	2.8	93%							Description and classification by visual examination of sample.	Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE

SITE

MISS on Site

Last Update: 04-30-92

HOLE NO. B38G23



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. B38G24
SITE MISS on Site			COORDINATES N 9400.0; E 9475.0			ANGLE FROM HORIZ BEARING Vertical		
BEGUN 10-2-89	COMPLETED 10-3-89	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Acker Soil Sentry	SIZE 8"	OVERBURDEN 16.9	ROCK (FT.) 4.8	TOTAL DEPTH 21.7
CORE RECOVERY (FT./%) 17.3/80*		CORE BOXES 1	SAMPLES 10	SEL. TOP CASING NA	GROUND EL. 57.0	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK 16.9/40.1
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: C. A. Clark			

SAMP. TYPE AND DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOKS	% CORE RECOVERY	LOSS IN G.P.M.	WATER PRESSURE TESTS		ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
						PRESS. P.S.I.	TIME MIN.					
SS	2.0	1.4	1-2 2-4					57.0			(Template: ZMYWD)	
SS	2.0	1.3	3-3 2-1					56.5			0.0 - 0.5 ft: Clay LOAM; Brownish black (5YR2/1), moist, moderate cohesion, loose, soft to medium stiff, abundant organics as roots, grass, leaves and bark.	Borehole advanced using 8" O.D. hollow-stem augers with no center plug.
SS	2.0	2.0	1/12" 1-1						5		0.5 - 9.3 ft: FILL; Very light gray (N8) laminated with Light bluish gray (5B7/1) and grayish black (N2), moist to slightly moist, moderately to highly cohesive; 2 mm to 2 cm thick stratified horizontal layers of soft "goo", little resemblance to natural material, some layers show short, dense fibers; sample parts at color/layer changes, low moisture content, soft to medium stiff.	Borehole monitored by TMA/Eberline during drilling for organic vapors and explosive gases; samples scanned for radioactive contamination - no elevated levels detected.
SS	2.0	2.0	1/12" 1/12"									
SS	2.0	1.3	1-4 5-7					47.7			9.3 - 15.3 ft: SAND, (SM); Brownish black (5YR2/1), with some (<20%) silt, moist, slight cohesion, fines adhere to sand particles; sand is well sorted, fine-grained, mostly subrounded silica and feldspars; abundant organics, mostly decomposed as fiber, bark and roots.	Gamma-logged by TMA/Eberline to a depth of 14.0'.
SS	2.0	1.7	6-9 13-22						10		at 9.7 ft: 3" layer of grayish Silty Sand, with olive gray reduction spots (2-7mm). at 12.5 ft: increase silt to 20%, mostly brownish black, fine-grained sand, color becomes greyish red.	Split spoon and auger refusal at 15.3'.
SS	1.9	1.0	13-37 28 50/5"									Falling-head permeability test conducted at 15.3'; mean permeability = 2.3E-04.
SS	1.2	1.1	32-43 50/3"					41.7	15		15.3 - 16.9 ft: Silty SAND, (SM); Grayish red (10R4/2), wet, dense, slight to no cohesion, silt particles adhere to sand particles; -70% sand, very fine to fine-grained silica; -30% silt; angular fragments of moderately cemented sandstone up to 3"; fragments show dark stains (limonite?).	Borehole backfilled with bentonite cement 9/21/89.
SS	0.7	0.7	26-50/3"					40.1			16.9 - 21.7 ft: SANDSTONE; Grayish red (5R4/2), highly fractured, slightly to moderately weathered; mature, fine to medium-grained silica sand; mud matrix, grain supported; no reaction to HCl; hard to medium hard; jointing is 95% normal to core axis, slightly rough, no staining or weathering on joint surfaces; average core piece is 0.2'; single vertical joint, surface is fresh, may be mechanically induced.	* Core recovery refers to total soil and rock sample.
NX	5.0	4.8	96%					35.3	20			Description and classification by visual examination of sample.
TOTAL DEPTH = 21.7 FT.											Colors from "Rock-Color Chart" (GSA, 1948).	

SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE	SITE MISS on Site	Last Update: 04-30-92	HOLE NO. B38G24
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GEOLOGIC DRILL LOG

PROJECT

FUSRAP

JOB NO.

14501

SHEET NO.

1 OF 2

HOLE NO.

B38G25

SITE

MISS on Site

COORDINATES

N 9199.0; E 9650.0

ANGLE FROM HORIZ

Vertical

BEARING

BEGUN

9-22-89

COMPLETED

9-25-89

DRILLER

Hydro Group, Inc.

DRILL MAKE AND MODEL

Acker Soil Sentry

SIZE

8"

OVERBURDEN

20.8

ROCK (FT.)

5.8

TOTAL DEPTH

26.6

CORE RECOVERY (FT./%)

15.1/57%

CORE BOXES

1

SAMPLES

13

EL. TOP CASING

NA

GROUND EL.

52.0

DEPTH/EL. GROUND WATER

7.9/44.1 7.86

DEPTH/EL. TOP OF ROCK

20.8/31.2

SAMPLE HAMMER WEIGHT/FALL

140 lbs/30 in

CASING LEFT IN HOLE: DIA./LENGTH

none

LOGGED BY:

C. A. Clark

SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOKS % CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	1.3	0.3	4-28 5/2"				52.0			0.0 - 8.2 ft: FILL; mostly Moderate brown (5YR4/4), sand, silt and gravel, with ash, slag and trace clay, slight to moderate cohesion, dense, some concrete fragments, bricks and mortar, slightly moist, trace to some organics as roots and grass, increased compaction with depth.	Borehole advanced using 8" hollow stem augers to a depth of 30.8'.
SS	2.0	1.1	16-20 22-19								Drill hole advances from 20.8, using NX surface set bit to a depth of 26.6'; drilling fluid is hydrant water.
SS	2.0	0.2	11-6 6-5					5			
SS	2.0	1.0	3-3 4-5								Sampled and gamma-logged by TMA/Eberline to a depth of 19.0'.
SS	2.0	1.5	4-3 4-8				43.8			8.2 - 16.3 ft: Silty SAND, (SM); Light olive gray (5Y6/1) to Medium light gray (N6), saturated, slight cohesion, medium stiff, mostly poorly graded, medium and coarse-grained sand, with some (25-30%) silt, fines adhere to coarse particles.	na = not applicable; shelly tube pushed into sediment.
ST	2.0	1.6	na					10			
SS	2.0	1.4	3-8 5-11							at 14 ft: Olive gray (5Y4/1) to Olive black (5Y2/1), mostly medium-grained with some to few fine and coarse-grained, rounded to subrounded silica sand.	
SS	2.0	1.5	11-17 20-15					15		15.8 - 15.9 ft: a pale yellowish brown, silt/clay interbed with very fine-grained sand.	Falling head permeability test conducted at 14.0'; mean permeability = 7.3E-06.
SS	2.0	1.1	6-14 35-32				35.7			16.3 - 20.8 ft: Sandy GRAVEL, (GM); Grayish red (10R4/2), wet, 16.3 - 17.0' is gravel with rounded fine and coarse-grained sand in silt/clay matrix.	
SS	2.0	1.5	13-39 13-32							at 18 ft., grayish red Clayey, Sandy Gravel, moderate cohesion, dense.	
SS	0.8	0.9	48 50/3"					20			
NX	4.0	1.7	43%				31.2			20.8 - 26.6 ft: SANDSTONE; Grayish red (5R4/2), slightly weathered, moderately to highly fractured, hard, well cemented, fine-grained sand in mud matrix, mostly grain supported, no reaction with HCl.	
										at 21 ft: increased fracture frequency to less than 3"; jointing is normal to core axis, planar and mostly smooth; no weathering, staining, coatings or discoloration of joint surfaces.	

SS = SPLIT SPOON; NX = CORE BARREL;
HX = HAND AUGER; ST = SHELBY TUBE

SITE

MISS on Site

Last Update: 04-30-92

HOLE NO. B38G25



GEOLOGIC DRILL LOG										PROJECT	JOB NO.	SHEET NO.	HOLE NO.
										FUSRAP	14501	2 OF 2	B38G25
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMPLE REC. CORE REC.	SAMPLE BLOMS % CORE RECOVERY	LOSS G.P.M.	PROB. WATER TESTS	PRESS. P.S.I.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	(Template: 2MYWD) DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
NX	1.8	1.3	73%					25.4			at 25 ft: core size increases significantly, one 1' piece.	Borehole backfilled with bentonite cement on 10-10-89.	
											TOTAL DEPTH = 26.6 FT.		

SS = SPLIT SPOON; NX = CORE BARREL; SITE
 HX = HAND AUGER; ST = SHELBY TUBE

MISS on Site

Last Update:
04-30-92

HOLE NO.
B38G25

* Core recovery refers to total soil and rock sample.
 Description and classification by visual examination of sample.
 Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG				PROJECT		JOB NO.	SHEET NO.	HOLE NO.			
MISS on Site				FUSRAP		14501	1 OF 1	B38G26			
SITE		COORDINATES				ANGLE FROM HORIZ		BEARING			
9-29-89		10-2-89		Hydro Group, Inc.		Acker Soil Sentry		8"			
13.2/60*		1		11		NA		51.0			
140 lbs/30 in		none		C. A. Clark							
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS IN CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.					
SS	2.0	0.9	3-2 2-3				51.0			0.0 - 3.3 ft: Clay LOAM; Brownish black (5YR2/1), moist to slightly moist, slight cohesion, weakly cemented soil agglomerates, abundant organics as fine roots; changing at 0.4' to Very pale orange (10YR8/2) to Dark yellowish orange (10YR6/6), slightly moist, with moderate cohesion, interbedded, thinly laminated, horizontal layers, alternating in hue, with indeterminate physical properties.	Borehole advanced using 8" hollow stem augers to a depth of 12.3'.
SS	2.0	1.7	1-1 3-1				47.7			3.3 - 5.6 ft: Silty SAND, (SM); Moderate brown (5YR4/4), slightly moist to moist, slight cohesion, moderate compaction; sand is poorly graded, fine-grained silica and feldspar; silt is 35-40%, as dark mafic flakes; no plasticity; some grayish red angular sandstone fragments up to 1/2"; diffuse gradational contact at 5.6'.	Drill hole advance using NX surface set bit to a depth of 21.9'; drilling fluid is hydrant water.
SS	2.0	1.4	3-7 18-29				45.4	5		5.6 - 8.3 ft: SAND; Moderate brown (5YR4/4), slightly moist, very slight cohesion, poorly graded, fine-grained sand; trace to few fines as dark mafic flakes; trace to some gravels at 7.0', difficult to push shelly tube, increased consistency to dense.	Falling head permeability test conducted at 6.1'; mean permeability = 2.3E-04.
ST	2.0	0.7	na				42.7			8.3 - 12.7 ft: Silty SAND; Grayish red (10R4/2), moist to 10.0', becoming wet; mostly fine and medium-grained, sub-rounded to round silica and feldspars; slightly to non cohesive, fines adhere to coarse particles due to high water content.	na = not applicable; shelly tube pushed into sediment.
SS	2.0	2.0	9-18 17-21				42.7			12.7 - 16.9 ft: Sandy, Clayey GRAVEL, (GC); Grayish red (10R4/2), wet, dense, -50% gravel, coarse 1/2 - 2", mostly angular; -25% sand, gap graded, coarse and fine-grained; -35% clay, stiff and sticky; some 1" angular sandstone fragments; moderate to strong compaction, difficult to advance split spoon due to large particles.	Sampled and gamma-logged by TMA/Eberline to a depth of 12.0'.
SS	1.9	1.0	14-25 40 50/5"				38.3			16.9 - 21.9 ft: SANDSTONE; Grayish red (10R4/2), well sorted, mature quartz sandstone; slightly to moderately weathered, slightly discolored, well cemented, grain supported, grayish red mud matrix, little to no reaction to HCl; slightly fractured, average core piece is 0.4 - 0.5', jointing is normal to core axis, slightly undulating, joint surfaces show no coatings, slightly weathered.	Borehole backfilled with bentonite cement 10-10-89.
SS	0.9	0.9	23 50/5"				34.1			TOTAL DEPTH = 21.9 FT.	* Core recovery refers to total soil and rock sample.
SS	1.4	1.1	22-32 50/5"				34.1				Description and classification by visual examination of sample.
SS	1.3	0.9	14-37 50/4"				29.1				Colors from "Rock-Color Chart" (GSA, 1948).
SS	0.9	0.8	17 50/4"								
NX	5.0	1.8	36%								

SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE

MISS on Site

Last Update: 04-30-92

HOLE NO. B38G26



GEOLOGIC DRILL LOG				PROJECT FUSRAP	JOB NO. 14501	SHEET NO. 1 OF 2	MOLE NO. B38G27
SITE MISS on Site		COORDINATES N 9100.0; E 9800.0			ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 9-27-89	COMPLETED 9-28-89	DRILLER Hydro Group, Inc.	DRILL MAKE AND MODEL Acker Soil Sentry	SIZE 8"	OVERBURDEN 19.3	ROCK (FT.) 7.0	TOTAL DEPTH 26.3
CORE RECOVERY (FT./%) 17.3/66°		CORE BOXES 1	SAMPLES 12	EL. TOP CASING NA	GROUND EL. 51.0	DEPTH/EL. GROUND WATER 7.3/43.7 7.27	DEPTH/EL. TOP OF ROCK 19.3/31.7
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH none			LOGGED BY: C. A. Clark		

SAMP TYPE AND DIAM.	SAMP. ADV. LEN CORE	SAMP. REC. CORE REC.	SAMP. ST. CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.					
SS	2.0	1.8	3-3 1-1				51.0			0.0 - 0.6 ft: Clayey, Sandy LOAM; Pinkish gray (5YR8/1), slightly moist, slight cohesion, weakly cemented soil agglomerates, abundant fine organics as roots and bark.	Borehole advanced using 8" hollow stem augers to a depth of 19.3'.
SS	2.0	1.9	1-1 2-2				50.4			0.6 - 6.7 ft: FILL; Pinkish gray (5YR8/1) to Grayish orange (10YR/4), slightly moist, becoming moist at 3.0'. 1/8 - 1/2" thick horizontal layers, moisture content varies with layer changes, some layers show fine-grained silica sand, remainder are silt size particles.	Drill hole advance using NX surface set bit to a depth of 26.3'; drilling fluid is hydrant water.
SS	2.0	2.0	1-1 1-3					5		at 5.5 ft: 0.6' thick brownish black Clay layer; slightly moist, moderate cohesion, clean, slightly plastic, some fine and medium roots, slightly decomposed to fresh.	Sampled and gamma-logged by TMA/Eberline to a depth of 12.0'.
SS	2.0	1.7	2-9 11-18				44.3			6.1 - 6.7 ft: bluish cowhides.	
SS	2.0	1.6	8-17 18-21							6.7 - 10.1 ft Interbedded Clayey SAND and CLAY, (SC-CL); Medium gray (N6) to Medium dark gray (N4), slightly moist, low moisture content in clay layers, moderate cohesion, medium stiff to stiff, slightly plastic, roll cracks at 2 cm; layers are variable in thickness, random in alternation; percentage of particle fractions vary between layers; particle size increase with depth, decrease occurrence of lean clayey layers; diffuse gradational contact with sand at 10.1'.	
SS	2.0	2.0	5-9 12-14				40.9	10			
SS	2.0	1.4	6-14 19-16							10.1 - 18.7 ft: SAND, (SM); Grayish black (N2) to Black (N1), wet, slightly to non cohesive, good compaction, moderately dense, adhesion due to high moisture content, well graded, mostly medium and coarse-grained sand with thin interbeds of silt with fine and very fine-grained sand; trace decomposed organic fibers.	Falling head permeability test conducted at 11.7'; mean permeability = 9.3E-06
SS	2.0	1.2	9-11 11-14					15			
SS	2.0	0.1	9-15 18-18								
SS	1.3	0.8	8-15 50/4"				32.3				
NX	5.0	0.9	18%				31.7	20		18.7 - 19.3 ft: Clayey GRAVEL, (GC); Grayish red (10R4/2), saturated, slight cohesion, fines adhere to coarse size particles, dense, abundant fine and some coarse size angular gravels in clay matrix.	
NX	2.0	1.9	95%							19.3 - 26.3 ft: SANDSTONE; Grayish red (10R4/2), slightly to moderately weathered, fine-grained, mature quartz sandstone, moderately cemented, grain supported, cement is mud and silica, no reaction to HCl; top foot is slightly fractured, moderately fractured from 21.0 - 22.0', highly fractured to 26.3'; joint patterns are indeterminate, core pieces are 2-3" subangular fragments.	

SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE	SITE MISS on Site	Last Update: 04-30-92	HOLE NO. B38G27
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GEOLOGIC DRILL LOG											PROJECT		JOB NO.	SHEET NO.	HOLE NO.	
											FUSRAP		14501	2 OF 2	B38G27	
SAMP. TYPE	SAMP. DIA.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	1/2 CORE RECOVERY	LOSS IN G.P.M.	WATER PRESS. TESTS	ELEV.	DEPTH	GRAPHICS	SAMPLE	(Template: 2MYLD)		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.		
												DESCRIPTION AND CLASSIFICATION				
								24.7				TOTAL DEPTH = 26.3 FT.		Borehole backfilled with bentonite cement on 10-10-89.		
SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE											SITE		MISS on Site		Last Update: 04-30-92	HOLE NO. B38G27

* Core recovery refers to total soil and rock sample.

Description and classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).



GEOLOGIC DRILL LOG										PROJECT		JOB NO.	SHEET NO.	HOLE NO.
MISS on Site										FUSRAP		14501	1 OF 2	B38G28
SITE					COORDINATES					ANGLE FROM HORIZ		BEARING		
MISS on Site					N 9139.0; E 9750.0					Vertical		-----		
BEGUN		COMPLETED		DRILLER			DRILL MAKE AND MODEL		SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH		
9-25-89		9-26-89		Hydro Group, Inc.			Acker Soil Sentry		8"	22.7	5.0	27.7		
CORE RECOVERY (FT./%)			CORE BOXES	SAMPLES	E.L. TOP CASING	GROUND EL.	DEPTH/E.L. GROUND WATER		DEPTH/E.L. TOP OF ROCK					
20.8/75*			1	14	NA	52.0	8.3/43.7 8.29		22.7/29.3					
SAMPLE HAMMER WEIGHT/FALL				CASING LEFT IN HOLE: DIA./LENGTH				LOGGED BY:						
140 lbs/30 in				none				C. A. Clark						
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. LOSS	RECOVERY	WATER PRESSURE TESTS	ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION		NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.			
									(Template: ZMYWD)					
SS	2.0	1.2	2-3	2-3		52.0			0.0 - 7.6 ft: FILL.		Borehole advanced using 8" hollow stem augers to a depth of 12.3'.			
									0.0 - 0.7 ft: Clayey Loam; Brownish Gray (5YR4/1), dry, slight cohesion, moderately cemented soil agglomerates, abundant organics as fine to medium roots.		Drill hole advance using NX Surface set bit to a depth of 20.3'; drilling fluid is hydrant water.			
SS	2.0	1.7	1-2	2-2			5		0.7 - 7.6 ft: Sludge; Light gray (N7) to Medium gray (N6), alternating thin layers of goo, particles are silt size, gritty, non plastic, residual goop, layer thickness is 2 mm to 5 cm, horizontal with sharp color contacts; some short fibrous material in light colored layers.		Hole sampled and gamma-logged by TMA/Eberline to 12.0'.			
SS	2.0	1.4	1-2	1-2										
SS	2.0	1.5	1/18"	4										
SS	2.0	1.5	2-8	10-13		44.4			7.6 - 9.5 ft: PEAT; Brownish black (5YR2/1), wet, moderate cohesion, soft, porous, blackish peat with silt and fine sand, slight H2S smell, no shine when smeared.					
ST	2.0	1.0	na			42.5	10		9.5 - 11.7 ft: SAND and SILT, (SM-ML); Light olive gray (5Y5/2) mottled with Light olive brown (5Y5/6) as reduction blebs, slightly moist, moderate cohesion, thinly laminated silts and sand; layering is swirled, mostly horizontal; contacts are slightly undulating, but sharp; sand is poorly graded, mostly fine-grained with some very fine and coarse-grained subrounded silica sand, non plastic, will not roll, soft mold, deforms easily.		Falling head permeability tests were conducted at depths of 12.0 and 20.0'; mean permeability at 12.0' = 1.8E-05, at 20.0' = 5.5E-04.			
SS	2.0	1.8	10-12	16-13		40.3			11.7 - 17.2 ft: SAND, (SM); Olive gray (5Y4/1), wet, slight to non cohesive, medium dense.					
SS	2.0	1.6	15-16	12-10			15		12.0 - 16.0 ft: poorly sorted, mostly medium and coarse-grained rounded silica, grades with depth to mostly fine-grained sand at 16.0'.					
SS	2.0	1.2	8-10	36-17		34.8			at 17.0 ft: 1" layer of medium-grained, quartz Sand above a 1/2-3/4" bluish gray Clay layer; sharp contact at 17.2'.					
SS	2.0	1.8	10-12	18-15			20		17.2 - 22.7 ft: Sandy GRAVEL, (GM); Brownish black (5YR2/1), wet, dense, well compacted, moderately cohesive, decreasing cohesion with depth; rounded gravels up to 1", trace to some clay in matrix; sand is moderately sorted, mostly coarse-grained with some very fine to medium grains.					
SS	2.0	1.1	8-18	21-22										
SS	0.7	0.5	34-60/2"											
NX	3.0	2.5	83%			29.3			22.7 - 27.7 ft: SANDSTONE; Grayish red (5R4/2), slightly weathered, dull, fine and very fine-grained sandstone, interbedded layers of siltstone 2-5 cm, hard, moderate pressure required to scratch, well cemented, grain supported with mud matrix; slightly					
SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE					SITE		MISS on Site		Last Update: 04-30-92		HOLE NO. B38G28			



GEOLOGIC DRILL LOG										PROJECT	JOB NO.	SHEET NO.	HOLE NO.
										FUSRAP	14501	2 OF 2	B38G28
SAMP. TYPE SAMP. DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMPLE BLOWS CORE RECOVERY	LOSS IN G.P.H	WATER PRESSURE		ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION (Template: ZMYMD)	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.	
					PRESS. P.S.F.	TIME MIN.							
NX	2.0	2.0	100%				24.3				fractured, fracture spacing is 0.3 - 0.5'; 14 of 15 joints are normal to core axis, openness is open to moderately wide, joint surfaces show no filling, smooth to slightly rough; occasional blotches of pale red alterations, slight decrease in hardness; increase occurrence of alterations in mud matrix with depth.	Borehole backfilled with bentonite cement on 10-10-89.	
TOTAL DEPTH = 27.7 FT.													

* Core recovery refers to total soil and rock sample.
Description and classification by visual examination of sample.
Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NX = CORE BARREL;
HX = HAND AUGER; ST = SHELBY TUBE

SITE

MISS on Site

Last Update: 04-30-92

HOLE NO. B38G28



GEOLOGIC DRILL LOG			PROJECT	FUSRAP	JOB NO.	14501	SHEET NO.	1 OF 2	HOLE NO.	B38W19D
SITE			COORDINATES			ANGLE FROM HORIZ		BEARING		
MISS on Site			N 9359.9; E 9515.1			Vertical		-----		
BEGUN	COMPLETED	DRILLER	DRILL MAKE AND MODEL	SIZE	OVERBURDEN	ROCK (FT.)	TOTAL DEPTH			
10-4-89	10-5-89	Hydro Group, Inc.	Acker Soil Sentry	8"	17.3	31.2	48.5			
CORE RECOVERY (FT./%)		CORE BOXES	SAMPLES	EL. TOP CASING	GROUND EL.	DEPTH/EL. GROUND WATER		DEPTH/EL. TOP OF ROCK		
32.0/66*		1	14	59.71	57.4	V / NA W / NA		17.3/40.1		
SAMPLE HAMMER WEIGHT/FALL		CASING LEFT IN HOLE: DIA./LENGTH			LOGGED BY:					
140 lbs/30 in		2"/50.2'			C. A. Clark					

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS / CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
				LOSS IN G.P.M.	PRESS. P.S.F.	TIME IN MIN.					
SS	2.0	1.5	2-8 11-9				57.4 57.1			0.0 - 0.3 ft: Clay LOAM; Brownish black (5YR2/1), dry to slightly moist, slight cohesion, some 0.5-1" weakly cemented soil agglomerates, -60% clay, -35% fine to medium sand, abundant roots.	Borehole advanced from 0 to 17.3' with 8" hollow stem augers and from 17.3 - 43.4' with 3" corebarrel; hole reamed to 48.5' with 8" roller bit.
SS	2.0	2.0	10-4 3-2						0.3 - 11.2 ft: FILL; alternating layers, 2 mm to 5 cm, of light to dark grey, olive, brown, and yellowish orange colored goop; layers are horizontal with sharp contacts at different color horizons, parting occurs at material/color changes; slightly moist to saturated, dependant on percentage of coarse-grained particles.		
SS	2.0	2.0	2-2 2-2								
SS	2.0	2.0	1-1 1-1								
SS	2.0	2.0	1/1.5' 1								
SS	2.0	2.0	1-4 17-28				46.2			11.2 - 17.3 ft: Silty SAND, (SM); Brownish black (5YR2/1) mottled with <10% Grayish red (5YR4/2), slightly moist to moist at 14.0', slight cohesion, gap graded, very fine and fine-grained sand, some rounded gravel up to 1.5"; non plastic, will not roll or mold; no shine when smeared.	
SS	2.0	1.6	14-22 22-25								
SS	2.0	1.4	27-9 9-14								
SS	1.3	0.9	11-21 50/4"				40.1				
NX	4.0	1.8	45%							17.3 - 48.5 ft: SANDSTONE; Grayish red (10YR4/2), interbedded with siltstone and mudstone; well sorted, fine-grained silica sand; some grains touch, mostly matrix supported; well cemented, mud and silica cement; no reaction to HCl, moderately hard; moderately fractured, average piece is 0.3"; slightly weathered, slight discoloration; joint orientation is 50% normal to core axis, remaining are inclined 40-45 degrees.	
NX	3.0	1.7	57%							17.0 - 18.0 ft: fracture zone, joint surfaces show black staining, slightly smooth, planar; interbedded zones of siltstone/mudstone; slightly softer, jointing tends to be bedding joints, plates part at color changes; bedding is horizontal, 2 mm to 2 cm in thickness with sharp contact boundaries, some show soft sediment deformation as ripple marks.	
NX	5.0	4.3	86%							20.0 - 34.0 ft: interbedded sandstone and	

SS = SPLIT SPOON; NX = CORE BARREL; SITE MISS on Site Last Update: 04-30-92 HOLE NO. B38W19D
 HX = HAND AUGER; ST = SHELBY TUBE



GEOLOGIC DRILL LOG										PROJECT	JOB NO.	SHEET NO.	HOLE NO.
										FUSRAP	14501	2 OF 2	B38W19D
SAMP. TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOWS	% CORE RECOVERY	WATER PRESSURE TESTS			ELEV.	DEPTH	GRAPHICS	SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
					LOSS IN G.P.M.	PRESS. P.S.I.	TIME MIN.						
NX	5.0	4.0	80%										
NX	9.1	4.8	53%										
								8.9					
TOTAL DEPTH = 48.5 FT.													

(Template: 2MYWD)

DESCRIPTION AND CLASSIFICATION

NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.

mudstone as above, two fracture zones between 20.3 - 20.7' and 23.3 - 24.4'; angular to subangular gravel fragments, 1/2" average; mudstone layers show abundant microfractures, parallel with bedding, most fractures are filled with gypsum(?) - no reaction to HCl; contacts between sandstone and mudstone are diffuse; by 25.0', fracture frequency decreases to <1 per foot, jointing remains normal to the core axis, open, with joint surfaces showing slight discoloration, no filling or stains.

at 30.0 - 31.0 ft: moderately fractured, average core piece is 0.2 - 0.3', jointing is normal to core axis, planar and mostly smooth, no discoloration, or stains, slightly faded.

by 34.0 ft: moderately to slightly fractured, average core piece is 0.8 - 1.2'; jointing is normal to core axis, planar and smooth; some 1-3 cm blebs showing clay alterations, swirls of faded greyish red, no significant decrease in hardness, slight alteration of matrix to clay.

39 - 48.5 ft: Sandstone, very fine to fine-grained, mature, silica sand in mud matrix, moderately hard to hard, well cemented, no reaction to HCl, some microfractures and marbling with gypsum as filling; slightly fractured, most jointing is normal to core axis, planar and smooth, clean and slightly open, no filling, remainder of jointing is inclined 40-50 degrees.

Lost circulation, <50% fluid recovery.

Monitoring Well B38W19D installed to 47.9' on 10/17/89.

* Core recovery refers to total soil and rock sample.

Description and classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE

SITE

MISS on Site

Last Update: 04-30-92

HOLE NO. B38W19D



GEOLOGIC DRILL LOG				PROJECT FUSRAP		JOB NO. 14501	SHEET NO. 1 OF 1	HOLE NO. B38W19S
SITE MISS on Site			COORDINATES N 9364.4; E 9506.3			ANGLE FROM HORIZ Vertical		BEARING -----
BEGUN 10-6-89	COMPLETED 10-9-89	DRILLER Hydro Group, Inc.		DRILL MAKE AND MODEL Acker Soil Sentry	SIZE 8"	OVERBURDEN 16.0	ROCK (FT.) 0.0	TOTAL DEPTH 16.0
CORE RECOVERY (FT./%) 11.8/74*		CORE BOXES 0	SAMPLES 8	SEL. TOP CASING 59.93	GROUND EL. 57.3	DEPTH/EL. GROUND WATER NA / NA		DEPTH/EL. TOP OF ROCK NA/NA
SAMPLE HAMMER WEIGHT/FALL 140 lbs/30 in		CASING LEFT IN HOLE: DIA./LENGTH 2"/18.4'			LOGGED BY: C. A. Clark			

SAMP TYPE AND DIAM.	SAMP. ADV. LEN. CORE	SAMP. REC. CORE REC.	SAMP. BLOBS RECOVERY	LOSS G.P.M.	WATER PRESSURE P.S.F. ST.	TIME MIN.	ELEV.	DEPTH	GRAPHICS SAMPLE	DESCRIPTION AND CLASSIFICATION	NOTES ON: WATER LEVELS, WATER RETURN, CHARACTER OF DRILLING, ETC.
SS	2.0	1.8	5/12" 9-10				57.3 57.0			0.0 - 0.3 ft: Clay LOAM ; Brownish black (5YR2/1), dry to slightly moist, slight cohesion, loose, some 1/2 - 1" weakly cemented soil agglomerates; -60% clay, -35% fine to medium sand, abundant roots.	Borehole advanced from 0 to 16.0' with 8" hollow stem augers.
SS	2.0	2.0	2-2 2-4						0.3 - 11.1 ft: FILL ; alternating layers, 2 mm - 5 cm, of light to dark gray, olive, brown and yellowish orange colored laminations, dry, soft and crumbly, partings occur at layer boundaries, horizontal stratifications, sharp and distinct contacts; slightly moist to saturated, generally, higher moisture content with coarser materials; some organics as roots to 6.0'; light gray layers are very fine to fine-grained, low moisture content, and little cohesion; blackish layers show no visible grains, high moisture content, soft and shiny when smeared; occurrence of blackish layers increase with depth.		
SS	2.0	2.0	2-1 1-2					5	at 6.0 - 8.0 ft: alternating layers, 2-5 cm thick, of black and light grey silt sized material; with laminations 2 mm - 2 cm thick, random in thickness orientation, layering is horizontal, contacts are sharp.		
SS	2.0	2.0	1/12" 1-1								
SS	2.0	2.0	3/24"								
SS	1.9	1.5	2-4-11 50/5"				46.2			11.1 - 16.0 ft: Silty SAND (SM) ; Brownish black (5YR2/1) marbled with <10% Grayish red within top 0.8', slightly moist, becoming moist to saturated at 12.0', below 14.0' decreases to slightly moist; slight cohesion; gap graded, very fine and fine-grained sand; some rounded gravel up to 1.5"; nonplastic, will not roll or mold; no shine when smeared.	
SS	0.4	0.1	50/3"							at 12.3 ft: boulder or cobble(?).	
SS	2.0	0.4	19-14 13-50				41.3			13.0 - 15.0 ft: -70% sand, well graded, mostly fine to medium-grained with some very fine and coarse grains, silt is dark with abundant mafic flakes.	
TOTAL DEPTH = 16.0 FT.											

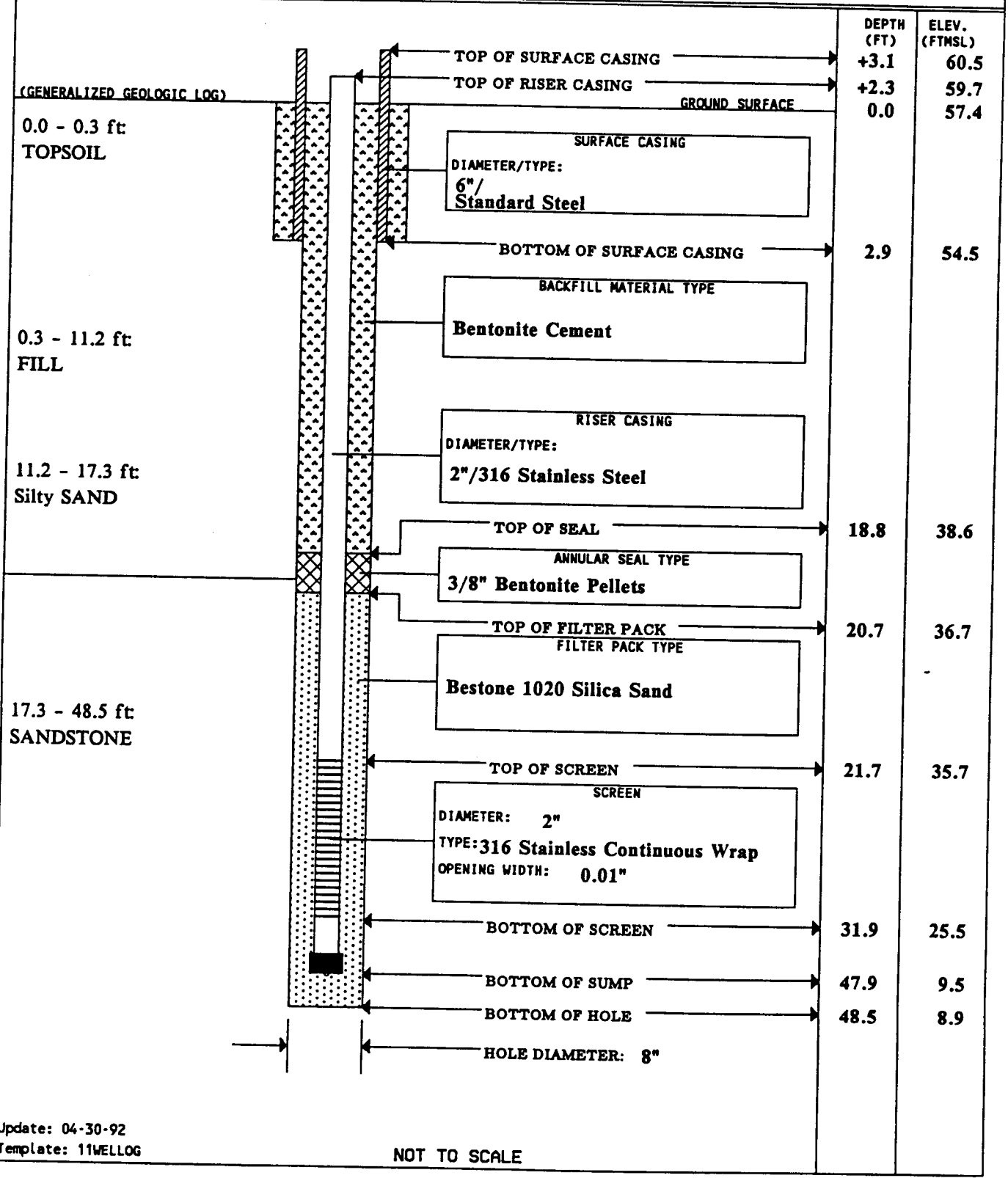
* Core recovery refers to total soil and rock sample.

Description and classification by visual examination of sample.

Colors from "Rock-Color Chart" (GSA, 1948).

SS = SPLIT SPOON; NX = CORE BARREL; HX = HAND AUGER; ST = SHELBY TUBE	SITE MISS on Site	Last Update: 04-30-92	HOLE NO. B38W19S
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JOB NO. 14501	SITE MISS on Site	COORDINATES and/or STATIONING N 9,360 E 9,515	
BEGUN 10-6-89	COMPLETED 10-12-89	PREPARED BY C. A. Clark	REFERENCE POINT FOR MEASUREMENTS Ground Surface



Update: 04-30-92
Template: 11WELLOG

NOT TO SCALE

APPENDIX K

Background Concentrations of Chemical Constituents in Soil

BACKGROUND CONCENTRATIONS OF CHEMICAL CONSTITUENTS IN SOIL

Table	Title	Page
K-1	Background Metal and Rare Earth Concentrations in Soil, Maywood Site	K-1
K-2	Baseline VOC Concentrations in Soil, Maywood Site	K-2
K-3	Baseline BNAE Concentrations in Soil, Maywood Site	K-3
K-4	Baseline Pesticide/PCB Concentrations in Soil, Maywood Site	K-5

Table K-1
Background Metal and Rare Earth
Concentrations in Soil, Maywood Site^a

Constituent	Sample Number			
	WS-0184	WS-0185	WS-0186	WS-0192
Silver, Total	2.26 UJ	4.7 J	5.1 J	2.26 U
Aluminum, Total	5890	8440 J	10500 J	4960 J
Arsenic, Total	1.5 B	2.3 B	7.1	2.3 J
Boron, Total	22.6 U	24.6 U	24.6 U	22.6 U
Barium, Total	31.5 B	56.2	48.8 B	42.0 B
Beryllium, Total	0.52 B	0.69 B	0.64 B	0.41 B
Calcium, Total	1510	1340 J	888 BJ	1100 BJ
Cadmium, Total	0.68 U	0.74 U	0.74 U	0.68 U
Cerium, Total	45.3 U	49.5	49.1 U	45.3 U
Cobalt, Total	7.7 B	9.6 B	9.9 B	3.3 B
Chromium, Total	9.4	18.8	17.5	5.3
Copper, Total	20.3	28.2 J	15.1	8.1
Dysprosium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Erbium, Total	354	678	785	206
Europium, Total	45.3 U	49.1 U	49.1	45.3 U
Iron, Total	14200 J	16800 J	21200 J	5590 J
Gadolinium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Holmium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Potassium, Total	228 B	337 B	726 B	329 B
Lanthanum, Total	45.3 U	49.1 U	49.1 U	45.3 U
Lithium	22.6 U	24.6 U	24.6 U	22.6 U
Lutetium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Magnesium, Total	2610 J	2230 J	1800 J	724 B
Manganese, Total	459 J	725 J	443 J	237 J
Molybdenum, Total	22.6 U	24.6 U	24.6 U	22.6 U
Sodium, Total	74.6 B	75.8 B	46.0 B	52.4 B
Neodymium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Nickel, Total	9.5	10.2	9.7 B	5.6 B
Niobium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Lead, Total	10.7 J	89.8 J	29.3 J	26.2
Praseodymium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Antimony, Total	4.53 UJ	4.91 UJ	4.91 UJ	4.53 U
Selenium, Total	0.46 UJ	0.49 UJ	0.41 UJ	0.43 U
Samarium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Terbium, Total	56.6 U	61.4 U	61.4 U	56.6 U
Tellurium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Thallium, Total	0.46 U	0.49 U	0.41 U	0.43 U
Thulium, Total	344	636	750	201
Vanadium, Total	19.4	22.7	31.3	11.3 U
Yttrium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Ytterbium, Total	45.3 U	49.1 U	49.1 U	45.3 U
Zinc, Total	35.1 J	102 J	39.1 J	25.7
Zirconium, Total	45.3 U	49.1 U	49.1 U	45.3 U

Concentration units - mg/kg - milligrams per kilogram

- U - The analyte was not detected. The minimum detection limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- B - Reported value was less than the CRDL but greater than or equal to the IDL.
- UJ - Associated value was analyzed for and was not detected but must be estimated due to quality control considerations.

Table K-2
Baseline VOC Concentrations
in Soil, Maywood Site*

Constituent	Sample Number			
	WS-0184	WS-0185	WS-0186	WS-0192
Chloromethane	12 U	14 U	11 U	12 U
Bromomethane	12 U	14 U	11 U	12 U
Vinyl chloride	12 U	14 U	11 U	12 U
Chloroethane	12 U	14 U	11 U	12 U
Methylene chloride	23 U	61	43	33 U
Acetone	42 U	12 J	6 J	41 U
Carbon disulfide	6 U	7 U	6 U	6 U
1,1-Dichloroethene	6 U	7 U	6 U	6 U
1,1-Dichloroethane	6 U	7 U	6 U	6 U
1,2-Dichloroethene (total)	6 U	7 U	6 U	6 U
Chloroform	6 U	7 U	6 U	6 U
1,2-Dichloroethane	6 U	7 U	6 U	6 U
2-Butanone	12 U	14 R	11 R	12 U
1,1,1-Trichloroethane	6 U	7 UJ	6 U	6 U
Carbon tetrachloride	6 U	7 UJ	6 U	6 U
Vinyl acetate	12 U	14 UJ	11 U	12 U
Bromodichloromethane	6 U	7 UJ	6 U	6 U
1,2-Dichloropropane	6 U	7 UJ	6 U	6 U
cis-1,3-Dichloropropene	6 U	7 UJ	6 U	6 U
Trichloroethene	6 U	7 UJ	6 U	6 U
Dibromochloromethane	6 U	7 UJ	6 U	6 U
1,1,2-Trichloroethane	6 U	7 UJ	6 U	6 U
Benzene	6 U	7 UJ	6 U	6 U
trans-1,3-Dichloropropene	6 U	7 UJ	6 U	6 U
2-Chloroethylvinylether	12 U	14 UJ	11 U	12 U
Bromoform	6 U	7 UJ	6 U	6 U
4-Methyl-2-pentanone	12 U	14 UJ	11 U	12 U
2-Hexanone	12 U	14 UJ	11 U	12 U
Tetrachloroethene	2 J	7 UJ	6 U	6 U
1,1,2,2-Tetrachloroethane	6 U	7 UJ	6 U	6 U
Toluene	6 U	3 J	2 J	8
Chlorobenzene	6 U	7 UJ	6 U	6 U
Ethylbenzene	6 U	7 UJ	6 U	6 U
Styrene	6 U	7 UJ	6 U	6 U
Xylene (total)	6 U	7 UJ	6 U	6 U
Acrolein	12 U	14 U	11 U	12 U
Acrylonitrile	12 U	14 U	11 U	12 U

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

J - Analyte present; reported as an estimated value.

UJ - Associated value was analyzed for and was not detected but must be estimated due to quality control considerations.

*Refer to Figure 4-1 for background/baseline sampling locations.

Table K-3
Baseline BNAE Concentrations
in Soil, Maywood Site^a

Page 1 of 2

Constituent	Sample Number			
	WS-0184	WS-0185	WS-0186	WS-0192
Phenol	400 U	2200 U	390 U	390 U
Bis(2-chloroethyl)ether	400 U	2200 U	390 U	390 U
2-Chlorophenol	400 U	2200 U	390 U	390 U
1,3-Dichlorobenzene	400 U	2200 U	390 U	390 U
1,4-Dichlorobenzene	400 U	2200 U	390 U	390 U
Benzyl alcohol	400 U	2200 U	390 U	390 U
1,2-Dichlorobenzene	400 U	2200 U	390 U	390 U
2-Methylphenol	400 U	2200 U	390 U	390 U
Bis(2-chloroisopropyl)ether	400 U	2200 U	390 U	390 U
4-Methylphenol	400 U	2200 U	390 U	390 U
N-Nitroso-Di-n-propylamine	400 U	2200 U	390 U	390 U
Hexachloroethane	400 U	2200 U	390 U	390 U
Nitrobenzene	400 U	2200 U	390 U	390 U
Isophorone	400 U	2200 U	390 U	390 U
2-Nitrophenol	400 U	2200 U	390 U	390 U
2,4-Dimethylphenol	400 U	2200 U	390 U	390 U
Benzoic acid	2000 UJ	11000 U	2000 UJ	1900 UJ
Bis(2-chloroethoxy)methane	400 U	2200 U	390 U	390 U
2,4-Dichlorophenol	400 U	2200 U	390 U	390 U
1,2,4-Trichlorobenzene	400 U	2200 U	390 U	390 U
Naphthalene	400 U	2200 U	390 U	390 U
4-Chloroaniline	400 U	2200 U	390 U	390 U
Hexachlorobutadiene	400 U	2200 U	390 U	390 U
4-Chloro-3-methylphenol	400 U	2200 U	390 U	390 U
2-Methylnaphthalene	400 U	2200 U	390 U	390 U
Hexachlorocyclopentadiene	400 U	2200 U	390 U	390 U
2,4,6-Trichlorophenol	400 U	2200 U	390 U	390 U
2,4,5-Trichlorophenol	2000 U	11000 U	2000 U	1900 U
2-Chloronaphthalene	400 U	2200 U	390 U	390 U
2-Nitroaniline	2000 U	11000 U	2000 U	1900 U
Dimethylphthalate	400 U	2200 U	390 U	390 U
Acenaphthylene	400 U	2200 U	390 U	390 U
2,6-Dinitrotoluene	400 U	2200 U	390 U	390 U
3-Nitroaniline	2000 U	11000 U	2000 U	1900 U
Acenaphthene	400 U	2200 U	390 U	390 U
2,4-Dinitrophenol	2000 U	11000 U	2000 U	1900 U
4-Nitrophenol	2000 U	11000 U	2000 U	1900 U
Dibenzofuran	400 U	2200 U	390 U	390 U
2,4-Dinitrotoluene	400 U	2200 U	390 U	390 U
Diethylphthalate	400 U	2200 U	390 U	390 U
4-Chlorophenyl-phenylether	400 U	2200 U	390 U	390 U
Fluorene	400 U	2200 U	390 U	390 U
4-Nitroaniline	2000 U	11000 U	2000 U	1900 U
4,6-Dinitro-2-methylphenol	2000 U	11000 U	2000 U	1900 U
N-Nitrosodiphenylamine (1)	400 U	2200 U	390 U	390 U
4-Bromophenyl-phenylether	400 U	2200 U	390 U	390 U
Hexachlorobenzene	400 U	2200 U	390 U	390 U
Pentachlorophenol	2000 U	11000 U	2000 U	1900 U
Phenanthrene	400 U	2200 U	390 U	390 U
Anthracene	400 U	2200 U	390 U	390 U

Table K-3
(continued)

Page 2 of 2

Constituent	Sample Number			
	WS-0184	WS-0185	WS-0186	WS-0192
Di-n-butylphthalate	400 U	2200 U	390 U	390 U
Fluoranthene	400 U	2200 U	59 J	84 J
Pyrene	400 U	2200 U	48 J	110 J
Butylbenzylphthalate	400 U	2200 U	390 U	390 U
3,3'-Dichlorobenzidine	800 U	4300 U	780 U	770 U
Benzo(a)anthracene	400 U	2200 U	390 U	77 J
Chrysene	400 U	2200 U	41 J	87 J
Bis(2-ethylhexyl)phthalate	400 U	2200 U	46 J	55 J
Di-n-octyl phthalate	400 U	2200 U	390 U	390 U
Benzo(b)fluoranthene	400 U	2200 U	390 U	64 J
Benzo(k)fluoranthene	400 U	2200 U	390 U	67 J
Benzo(a)pyrene	400 U	2200 U	390 U	68 J
Indeno(1,2,3-cd)pyrene	400 U	2200 U	390 U	390 U
Dibenzo(a,h)anthracene	400 U	2200 U	390 U	390 U
Benzo(g,h,i)perylene	400 U	2200 U	390 U	390 U
N-Nitrosodimethylamine	400 U	2200 U	390 U	390 U
Benzidine	2000 U	11000 U	2000 U	1900 U
1,2-Diphenylhydrazine	400 U	2200 U	390 U	390 U

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram

- U - The analyte was not detected. The minimum quantitation limit for the sample is reported.
- J - Analyte present; reported as an estimated value.
- UJ - Associated value was analyzed for and was not detected but must be estimated due to quality control considerations.

*Refer to Figure 4-1 for background/baseline sampling locations.

Table K-4
Baseline Pesticide/PCB Concentrations
in Soil, Maywood Site*

Constituent	Sample Number			
	WS-0184	WS-0185	WS-0186	WS-0192
alpha-BHC	4.8 U	26 U	9.4 U	4.6 U
beta-BHC	4.8 U	26 U	9.4 U	4.6 U
delta-BHC	4.8 U	26 U	9.4 U	4.6 U
gamma-BHC (Lindane)	4.8 U	26 U	9.4 U	4.6 U
Heptachlor	4.8 U	26 U	9.4 U	4.6 U
Aldrin	4.8 U	26 U	9.4 U	4.6 U
Heptachlor epoxide	4.8 U	26 U	9.4 U	4.6 U
Endosulfan I	4.8 U	26 U	9.4 U	4.6 U
Dieldrin	9.7 U	52 U	19 U	9.2 U
4,4'-DDE	9.7 U	52 U	19 U	9.2 U
Endrin	9.7 U	52 U	19 U	9.2 U
Endosulfan II	9.7 U	52 U	19 U	9.2 U
4,4'-DDD	9.7 U	52 U	19 U	9.2 U
Endosulfan sulfate	9.7 U	52 U	19 U	9.2 U
4,4'-DDT	9.7 U	52 U	19 U	9.2 U
Methoxychlor	48 U	260 U	94 U	46 U
Endrin ketone	9.7 U	52 U	19 U	9.2 U
Endrin aldehyde	9.7 U	52 U	19 U	9.2 U
alpha-Chlordane	48 U	260 U	94 U	46 U
gamma-Chlordane	48 U	260 U	94 U	46 U
Toxaphene	97 U	520 U	190 U	92 U
Aroclor-1016	48 U	260 U	94 U	46 U
Aroclor-1221	48 U	260 U	94 U	46 U
Aroclor-1232	48 U	260 U	94 U	46 U
Aroclor-1242	48 U	260 U	94 U	46 U
Aroclor-1248	48 U	260 U	94 U	46 U
Aroclor-1254	97 U	520 U	190 U	92 U
Aroclor-1260	97 U	520 U	190 U	92 U

Concentration units - $\mu\text{g}/\text{kg}$ - micrograms per kilogram

U - The analyte was not detected. The minimum quantitation limit for the sample is reported.

*Refer to Figure 4-1 for baseline sampling locations.